Institute for 21st Century
Business Series No. 5

FISH AS A HOUSEHOLD MENU ITEM

Attitudes of Consumers

In Cuyahoga and Summit Counties, Ohio

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by

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FOREWORD

This monograph dealing with consumers' use of fish as a menu item is the fourth in a series relating to the marketing and physical distribution of fish and fish products into the Midwest.* This research is a Sea Grant project at Kent State University. Other monographs were published in 1973, and related to the channel members: retailers (January); wholesalers (May); and institutional users (September). The setting for all four studies is Cuyahoga and Summit counties, Ohio.

Other monographs relating to the Kent State University Sea Grant project will deal with the relative importance of household characteristics affecting attitudes regarding fish, particularly fresh fish; the physical distribution patterns for the movement of fresh fish into the Midwest from the coasts and Canada; and Fresh Water Fish Marketing Corporation of Canada.

All these studies should prove useful to members of the fishing industry, students of marketing, members of the distribution channels, and governmental agencies concerned with fish as a menu item.

Donald F. Mulvihill
Co-Principal Investigator

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*NOAA 2-35364, Application of Computer Technology and Advanced Physical Distribution Techniques to Seafood Marketing.

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CHARACTERISTICS OF REGULAR VERSUS IRREGULAR CONSUMERS OF FIN, SHELL, AND CANNED FISH

Background Of The Study

This research report stems from the Federal government's interest in maintaining a viable finfish and shellfish industry. A viable industry is predicated upon a robust market for its product; hence, concern about the relative demand for fish in the United States intensified because consumption of commercially caught fish remained stable at approximately eleven pounds of edible weight per person annually from 1916 through 1970.[1]

There are also distinct differences in per capita consumption rates among the various geographical regions of the United States. For example, in the New England seaboard region per capita consumption averaged 17.6 pounds in 1969, whereas it was 10.0 pounds in the Midwest. Among the explanations put forth is the suggestion that lower per capita consumption in the Midwest may be due to the more limited quantity of fresh fish available to consumers located inland. If so, one way to expand demand is to

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[1]In contrast to the stable per capita consumption of commercially caught fish, the consumption of meat and poultry measured in pounds equivalent to the form sold at retail in food stores went up by 30.1 pounds and 33.8 pounds per capita, respectively, from 1916 to 1970. Agricultural Statistics, 1972; (Washington: U.S. Government Printing Office; 1972, p. 688).

increase the availability of fresh fish to consumers situated inland. For this reason, Kent State University was awarded a grant by the National Science Foundation in the fall of 1970 to study the consumption and distribution of finfish and shellfish in the Midwest.

Objectives Of The Study

The contention that fish consumption is a function of the supply available inherently subsumes that the demand for fish is likely to increase when the supply is increased. But, will it? Clearly, acceptance of this supposition is critical if one is to adopt the proposition that (profitable) sales of fish to inland consumers will increase with the availability of more fish. This supposition calls for exhaustive investigation; however, it is an elusive question to resolve since it deals with all of the subtleties inherent in the nature of the consumer's decision process either to purchase or not to purchase fish. Obvious demographic characteristics, such as income, age, size of family, religion, or nationality, are important variables that must be examined; in addition, consumers' attitudes toward fresh, frozen, and canned fish must also be explored and evaluated to determine how they affect the decision process.

The overall objective of this study is to conduct exploratory research of a primary nature utilizing univariate and multivariate techniques. Hopefully, these will yield

attitudinal and demographic profiles for both regular and irregular users of fresh, frozen unprepared, and frozen prepared finfish and shellfish, as well as canned fish. Such profiles should prove useful in segmenting regular users from irregular users for promotional and merchandising efforts.

Definitions

As a product, fish is marketed in seven diffrent basic forms. These are identified in this study as:

1. Fresh finfish - All types of finfish, such as haddock, flounder, cod, or perch, that are marketed in unfrozen and unprepared form.

2. Frozen unprepared finfish - Finfish, such as haddock, cod, flounder, or perch, that are bought frozen but without breading.

3. Frozen prepared finfish - All types of finfish purchased in frozen form and ready to cook, such as fish sticks or breaded fillets.

4. Fresh shellfish - All types of shellfish, such as shrimp, clams, oysters, or lobsters, that are marketed in unfrozen and unprepared form.

5. Frozen unprepared shellfish - Shellfish, such as shrimp, clams, oysters, or lobsters, that are bought frozen but without breading.

6. Frozen prepared shellfish - All types of shellfish that are bought frozen and ready to cook, such as breaded shrimp or breaded clams.

7. Canned fish - All types of fish that are in canned form, such as tuna, salmon, mackerel, sardines, pickled herring, or oysters.

Regular users of a given type of finfish, shellfish, or canned fish are defined as respondents using that particular type of fish at home once a month or more. Irregular users

purchase a given type of fish less than once a month. Each respondent is classified as either a regular or irregular user of each of the seven types of fish. Every respondent, therefore, is classified in seven different ways.

Scope Of The Study

Geographical Area

The geographical area surveyed in this study is Cuyahoga and Summit counties, Ohio. Included in these counties are the cities of Cleveland and Akron, which form a major urban-industrial complex. The outlying regions of these counties are essentially suburban in nature, although rural areas also are present. The total population in the two counties is approximately 2,275,000.

The reasons why Cuyahoga and Summit counties, Ohio, were selected for survey purposes may be summarized as follows:

1. The two counties encompass a favorable combination of urban, suburban, and rural areas, as well as social classes.
2. Fresh finfish and shellfish are available in the area, but not to the extent they are obtainable in coastal regions.
3. Proximity to Kent State University and budgetary considerations.

Survey Period

The methodology and questionnaire used in the study were developed during the period from July, 1971, to February, 1972. Data were collected from March, 1972, to June, 1972. Analysis of the data was performed by computer during the summer of 1972.

Research Methodology

Sample Design

Approximately 5,000 households were chosen randomly from the street address telephone directories which included addresses of unlisted numbers for Cuyahoga and Summit counties. These directories were combined so the pages could be numbered consecutively from 1 to 2,000. A random number computer program was then utilized to select the page, column, and row numbers in the directories. Commercial addresses were omitted when selected by this process. Through subsequent questionnaire mailings and telephone follow-ups, 4,323 of the randomly chosen addresses were found to be valid addresses.

Telephone company personnel reported that around 9 per cent of the families in Cuyahoga and Summit counties were without telephones at the time of the survey. These families, therefore, were excluded from the universe from which the sample was drawn. However, the advantages of: (a) ease and efficiency of follow-up by phone; (b) relative currentness of addresses as compared to other sources; and (c) low cost of the listings were viewed as outweighing this disadvantage.

Data Collection Instruments

Visual and oral data collection instruments were used in this study. The visual instruments consisted of a questionnaire and an accompanying cover letter, while the oral instrument was the telephone used for follow-up purposes. Copies of

the questionnaire and cover letter are contained in the Appendix.

Questionnaire Design. The questionnaire was designed to obtain three types of information from respondents: (a) their attitudes toward each of the seven basic types of fish; (b) their consumption frequencies; and (c) demographic data.

Attitudes. The semantic differential technique was selected as the means of measuring respondents' attitudes. The semantic differential technique is a combination word association and scaling technique used to measure the meaning of concepts. For example, respondents were asked to rate a concept (e.g., taste of frozen shellfish) on a seven point bipolar adjective scale (e.g., good or bad). Progressing from left to right on the seven point scale, the positions were described to respondents as representing "extremely good," "quite good," "slightly good," "neither good nor bad," "slightly bad," "quite bad," or "extremely bad" taste. Respondents were instructed to mark the scales quickly and not try to select a "correct" answer. In tabulating the results, the weights assigned to each position on the scales are converted to average (mean) scores and presented in "profile" form.[2]

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[2]For a more detailed discussion, see C. E. Osgood, C. J. Suci, and P. H. Tannenbaum, The Measurement of Meaning (Urbana, Ill.: University of Illinois Press, 1957).

Selecting the appropriate bi-polar adjectives is the most critical and difficult phase in employing the semantic differential technique. For this reason, approximately 50 attitudinal variables were selected from the literature dealing with fish and compiled into questionnaire form in the initial stage of operationalization. The questionnaire was then administered to 15 housewives by means of semi-structured personal interviews. This method of interviewing was used since the purpose of the first stage was to learn as much as possible about the appropriateness of the variables under consideration, and also to uncover other variables which might have been overlooked. As a result of these initial interviews, 15 variables were eliminated because of redundancy, lack of relevance, or difficulty in operationalization.

The remaining 35 variables were converted into scalar form and compiled into a seven-page questionnaire for a second pretest. This questionnaire and an accompanying cover letter were mailed to 90 households randomly selected from the Kent and Ravenna, Ohio, telephone directory. Forty-seven usable questionnaires were returned, representing about a 50 per cent response. Several telephone follow-up were made to nonrespondents to determine reasons for their non-response. Respondents who submitted questionnaires that were completed incorrectly were also contacted by telephone to

ascertain the reasons for their difficulty. As a result of the second pretest, 11 more scalar variables were eliminated; the semantic differential instructions were rewritten; and the layout of the semantic differential scales was modified.

The final list of 24 attitudinal variables selected for investigation is shown in Table 1. The operationalized versions of these variables are shown in the questionnaire in the Appendix.

TABLE 1

ATTITUDINAL VARIABLES INVESTIGATED IN THE STUDY

1. Taste
2. Taste compared to meats
3. Nutrition
4. Nutrition compared to meats
5. Cost
6. Cost compared to meats
7. Aroma
8. Aroma compared to meats
9. Perishability
10. Perishability compared to meats
11. Preparation before cooking
12. Preparation before cooking compared to meats
13. Cooking
14. Cooking compared to meats
15. Appearance
16. Appearance compared to meats
17. Quality
18. Quality compared to meats
19. Availability in food stores
20. Image as a dinner item
21. Image as a meal for guests
22. Image as a meal for weight-watchers
23. Safety in eating
24. Safety in eating compared to meats

Demographic Variables. The demographic variables were also initially chosen by surveying the literature dealing with fish consumption. They were pretested in the interviews with housewives and subsequently in the trial mail survey of the questionnaire conducted in Kent and Ravenna. Twelve demographic variables were ultimately incorporated into the final draft of the questionnaire on the basis of their relevancy and feasibility of operationalization. These are listed in Table 2.

TABLE 2

DEMOGRAPHIC VARIABLES INVESTIGATED IN THE STUDY

1. Age of housewife	7. Household income
2. Age of head of household	8. Protestant or not
3. Number of children	9. Catholic or not
4. Age category of children	10. Jewish or not
5. Size of household	11. White or not
6. Education of head of household	12. Black or not

The demographic variables indicating race and religion are qualitative in nature in contrast to income, age, or size of family which are quantitive values. While quantitive values can be summed to derive group averages for comparisons of similarities and differences between regular and irregular purchasers, the qualitative variables (race and religion) cannot

be handled in this manner. Instead, these factors are treated in dummy variable fashion, that is, respondents are grouped on a dichotomour basis. Religion, consequently, is shown as Protestant or not; Catholic or not; and Jewish or not; while race is presented as white or not and black or not.

Data Collection Procedure

The packets containing a cover letter, questionnaire, and return envelope were grouped by zip code within Summit and Cuyahoga counties and mailed in batches by first class mail to each of the households selected in the sample. About ten days after mailing each batch, the nonrespondents were contacted by telephone. A maximum of four attempts were made to reach each nonrespondent by phone. When nonrespondents were contacted, an effort was made to persuade them to complete and return the questionnaire. In the event a questionnaire was lost or misplaced, another mailing was sent to the nonrespondent. Those nonrespondents unable to be reached by phone were sent additional questionnaries. If these second questionnaires were not returned in ten days, a third and final questionnaire was sent.

From the 4,323 valid addresses, 1,640 usable questionnaires were returned by mail. In addition, 90 questionnaires were completed by means of lengthy telephone interviews with nonrespondents selected at random one month after the survey was terminated. The original 1,640 returns plus the 90

phone interviews represent an overall response rate of 40.1 per cent.

Table 3 presents comparison of the respondents' household income, race, and size of household with that of the overall population in Cuyahoga and Summit counties. Clearly, the non-significant chi-square tests indicate that the socio-economic segments are represented in the sample responses in approximately the same proportion as in the population of the two counties.

To determine if the nonrespondents in the sample differed from the respondents, data obtained from the 90 nonrespondents one month after the survey terminated were compared to respondents' replies. An overall test on the groups' centroids (vectors of means of attitudinal variables) produced an F-ratio of 1.93, which is non-significant at the .05 level. The test shows that nonrespondents do not differ significantly from respondents on the basis of demographic variables.

Preparation and Analysis of Survey Data

Data Preparation

The questionnaires were carefully examined for omissions as they were received. Respondents were contacted by telephone for any missing information regarding attitudes, purchasing patterns, or demographic data other than race or religion. Rather than discard questionnaires that virtually

TABLE 3 SAMPLE COMPARED TO CENSUS DATA FOR CUYAHOGA AND SUMMIT COUNTIES

Variable	Sample	Census*
Household income:		
Under $4,000	9.9%	10.3%
$4,000 - 5,999	7.5	7.3
$6,000 - 7,999	10.8	9.7
$8,000 - 9,999	13.5	14.0
$10,000 - 11,999	16.9	14.7
$12,000 - 13,999	13.4	14.8
Over $14,000	28.0	29.2
	100.0%	100.0%
(χ^2 = 11.33, d.f. = 6, non-significant at .05 level)		
Race:		
White	88.3%	86.9%
Black	11.7	13.1
	100.0%	100.0%
(χ^2 = 2.93, d.f. = 1, non-significant at .05 level)		
Size of household:		
1 person	10.8%	9.9%
2 - 3 persons	47.4	46.7
4 - 5 persons	30.5	30.1
6 - 7 persons	8.5	10.1
8 - 9 persons	2.1	2.3
10 or more	0.7	0.9
	100.0%	100.0%
(χ^2 = 7.38, d.f. = 5, non-significant at .05 level)		

*1970 Census of the Population, U. S. Department of Commerce, Bureau of the Census.

were complete, except for a variable such as race, religion, education, or income, the data were standardized subsequently by a computer program on the means of the variables where the omissions occurred. This procedure essentially neutralized the omissions after each questionnaire was edited, coded, and punched on cards. All of the data on the cards were then put on tape for analysis by computer.

Analysis of the Survey Data

The survey data are analyzed essentially in two different ways. Univariate analysis is utilized to obtain consumers' profiles, whereas multivariate analysis is employed in classifying respondents as regular or irregular consumers of each type of fish.

Attitudinal and Demographic Profiles. The attitudinal and demographic profiles of regular versus irregular consumers of each type of fin and shellfish (fresh, frozen unprepared, and frozen prepared), as well as canned fish, are obtained by use of univariate analysis. The univariate method is a simple one-way analysis of variance between group means (averages) for regular versus irregular users of each type of fish. It aids in identifying the statistically significant variables between the groups. The computer program utilized for univariate analysis of differences in group means is the MANOVA

Program developed by Cooley and Lohnes.[3]

Discriminant Attitudinal and Demographic Functions of Regular Versus Irregular Users. The second type of analysis utilized in this study is stepwise multiple discriminant analysis of the attitudinal and demographic variables. The objective of discriminant analysis is to classify objects or individuals into two or more mutually exclusive groups. By means of discriminant analyses of the attitudinal and demographic variables, one should be able to predict whether a consumer is a regular or irregular user of a particular type of fish. The computer program utilized is the BMDO 7M Stepwise Discriminant Analysis Program.[4]

The predictive efficiency of each discriminant function is evaluated by testing the significance of the difference between the proortion of respondents correctly classified as either regular or irregular users by the discriminant functions, and the proportion of correctly classified.

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[3]W. C. Cooley and P. R. Lohnes, Multivariate Procedures in the Behavioral Sciences (New York: John Wiley & Sons Co., 1963), pp. 238-24. This program was modified by the staff of the Kent State Computer Center for the Burrows 5500, B-5500 STATKSU, Documentation (Kent, Ohio: Kent State University Bookstore, 1972) pp. 039-01,02.

[4]W. J. Dixon (ed.), BMD Biomedical Computer Programs, Health Sciences Computing Facility, Department of Preventive Medicine and Public Health, School of Medicine, University of California (Los Angeles, Revised September 1, 1965) pp. 587-605. This program for stepwise discriminant analysis was written by Paul Sampson, UCLA.

respondents that could be expected by random proportional guessing.[5] In order to reduce the possibility of biasing the tests, a procedure suggested by Frank, Massy, and Morrison is followed.[6] That is, the entire sample of respondents is divided into two subsamples with equal numbers of regular and irregular users in each subsample known as the analysis sample and the validation sample. The discriminant functions are first derived from the analysis sample and are then applied to the validation sample to test their predictive efficacy.

Overview of Number of Regular And Irregular Users of Each Type of Fish

Consumption patterns of the 1,730 respondents for each of the seven different types of fish are summarized in Tables 4, 5, and 6. As explained earlier, a respondent is classified as a regular user when he purchases that particular type of fish once a month or more. If he does not do so, he is identified as an irregular user.

Overview of Regular and Irregular Finfish Users

The number of regular and irregular users of each type of finfish, as well as their usage of the alternate forms of

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[5]Donald G. Morrison, "On the Interpretation of Discriminant Analysis," Journal of Marketing Research, Vol. VI (May, 1969), pp. 156-63.

[6]R. E. Frank, W. F. Massy, and D. G. Morrison, "Bias in Multiple Discriminant Analysis," Journal of Marketing Research Vol. II (August, 1965), pp. 250-58.

finfish, are summarized in Table 4. For example, 652 respondents are regular users of fresh finfish, while 1,078 are irregular users. Among the 652 regular users of fresh finfish, 289 are also regular users of frozen unprepared finfish, and 363 are irregular users of frozen unprepared finfish. The interpretation of the data in Table 4 is similar for each type of finfish.

Several generalizations regarding respondents' consumption patterns of finfish may be drawn from these data:

1. On a composite basis for all three types of finfish, approximately two-thirds of the respondents are irregular users, while one-third are regular users of finfish.

2. Among the regular users, a higher proportion are regular users of fresh finfish than frozen unprepared or frozen prepared finfish.

3. Regular users of either fresh or frozen unprepared and frozen prepared finfish are more likely to be regular users of the alternate types of finfish than are the irregular users.

4. Regular users of fresh finfish tend to consume frozen unprepared finfish more regularly than frozen prepared finfish. Regular users of frozen prepared finfish, on the other hand, tend to consume frozen unprepared finfish more regularly than fresh finfish.

Overview of Regular and Irregular Shellfish Users

Data showing the number of regular and irregular users of fresh, frozen unprepared, and frozen prepared shellfish are summarized in Table 5. Among the generalizations that may be drawn from the data are the following observations:

1. On a composite basis for all three types of shellfish, 85 per cent of the respondents are irregular users, while 15 per cent are regular users of shellfish. Nearly twice as many respondents, therefore, are regular users of finfish in contrast to the number of regular users of shellfish.

2. Among the regular shellfish users, a higher proportion are regular users of fresh shellfish than frozen unprepared or frozen prepared shellfish.

3. Unlike regular finfish users, the second highest proportion of regular shellfish users are consumers of frozen prepared shellfish rather than the frozen unprepared form.

4. Regular users of each type of shellfish are more likely to be regular users of the other types of shellfish than are the irregular users of each type.

5. Similar to the regular users of fresh finfish, the regular users of fresh shellfish are more likely to be regular users of frozen unprepared shellfish than frozen prepared shellfish. Regular users of frozen prepared shellfish are also more likely to be regular users of frozen unprepared shellfish than fresh shellfish.

Overview of Regular and Irregular Canned Fish Users

The number of regular and irregular users of canned fish, as well as their usage of various types of finfish, are shown in Table 6. The usage patterns evident from the data in Table 6 are:

1. Sixty per cent of the respondents are regular consumers of canned fish, while only 40 per cent are irregular users. This is the highest proportion, by far, of regular users of a particular type of fish covered in this study.

2. Within the regular user group for canned fish, about 40 per cent of the respondents are also regular users of fresh, frozen unprepared, or frozen prepared finfish.

3. Eighty per cent of the irregular users of canned fish are also irregular users of frozen unprepared

TABLE 4
NUMBER OF REGULAR AND IRREGULAR USERS OF FINFISH AND THEIR USAGE OF OTHER TYPES OF FINFISH

CLASSIFICATION	No.	%	Usage of Other Types of Finfish: FRESH Regular No.	%	FRESH Irregular No.	%	FROZEN UNPREPARED Regular No.	%	FROZEN UNPREPARED Irregular No.	%	FROZEN PREPARED Regular No.	%	FROZEN PREPARED Irregular No.	%
Fresh														
Regular	652	37.8					289	46.0	363	54.0	207	31.4	445	68.6
Irregular	1,078	62.2					257	24.0	821	76.0	314	29.2	764	70.8
Total	1,730	100.0												
Frozen Unprepared														
Regular	546	31.5	289	53.0	257	47.0					253	46.4	293	53.6
Irregular	1,184	68.5	363	30.1	821	69.0					268	22.6	916	77.4
Total	1,730	100.0												
Frozen Prepared														
Regular	521	30.1	207	39.9	314	60.1	253	48.6	268	51.4				
Irregular	1,209	69.9	445	36.8	764	63.2	293	24.2	916	75.8				
Total	1,730	100.0												

Source: Survey data.

TABLE 5

NUMBER OF REGULAR AND IRREGULAR USERS OF EACH TYPE
OF SHELLFISH AND THEIR USAGE OF OTHER TYPES OF SHELLFISH

Classification	No.	%	Usage of Other Types of Shellfish: Fresh — Regular No.	Fresh — Regular %	Fresh — Irregular No.	Fresh — Irregular %	Frozen Unprepared — Regular No.	Frozen Unprepared — Regular %	Frozen Unprepared — Irregular No.	Frozen Unprepared — Irregular %	Frozen Prepared — Regular No.	Frozen Prepared — Regular %	Frozen Prepared — Irregular No.	Frozen Prepared — Irregular %
Fresh														
Regular	297	17.1					123	41.4	174	58.6	90	30.3	207	69.7
Irregular	1,433	82.9					102	7.1	1,331	92.9	170	12.9	1,263	87.1
Total	1,730	100.0												
Frozen Unprepared														
Regular	225	13.0	123	54.8	102	45.2					107	47.6	118	52.4
Irregular	1,505	87.0	174	11.6	1,331	88.4					153	10.2	1,352	89.8
Total	1,730	100.0												
Frozen Prepared														
Regular	260	15.0	90	34.6	170	65.4	107	41.2	153	58.8				
Irregular	1,470	85.0	207	14.1	1,263	85.9	118	8.0	1,352	92.0				
Total	1,730	100.0												

Source: Survey data.

and frozen prepared finfish. However, it is interesting to note that only 65 per cent of the irregular canned fish users are irregular users of fresh finfish.

Univariate Analyses of Attitudinal and Demographic Profiles

In univariate analysis, the responses of the regular and irregular users of each type of fish are first averaged for each attitudinal and demographic variable. Comparisons are then made on a univariate basis between the respective group menas (M) (averages) of the regular and irregular users for each variable to determine if they are statistically different at a designated level of significance (.05 in these runs). In this manner, profiles of regular and irregular users emerge in terms of the variables that are statistically different or not different between the regular and irregular user groups.

It is necessary to look at both the F-ratios and the group mean values in order to interpret the data dealing with the univariate comparisons of group means. A significant F-ratio for a given variable indicates that a statistically significant difference in attitudes exists between the groups for that particular variable. The variables' mean values aid in interpreting the results, since they indicate the direction in which the groups scored the variable, as well as the degree of the score. For example, the attitude taste has a mean score of 1.48 for the regular users of fresh finfish, and 2.38 for the irregular users. The F-ratio is 228.33, which denotes a

TABLE 6

NUMBER OF REGULAR AND IRREGULAR USERS OF CANNED FISH AND THEIR USAGE OF VARIOUS TYPES OF FINFISH

CANNED FISH	No.	%	Usage of Types of Finfish									
			FRESH				FROZEN UNPREPARED				FROZEN PREPARED			
			Regular		Irregular		Regular		Irregular		Regular		Irregular	
			No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Regular	1,044	60.4	410	39.2	634	60.8	408	39.0	635	61.0	389	37.2	655	62.8
Irregular	686	39.6	242	35.3	444	64.7	136	19.8	550	80.2	132	19.3	554	80.7
Total	1,730	100.0												

Source: Survey data.

significant difference in attitude toward taste between the regular and irregular users of fresh finfish. According to the mean scores of 1.48 and 2.38, however, both groups view the taste of fresh finfish favorably (direction of the scores). The significant difference occurs because of the difference (degree of the scores) in mean values.

Attitudinal and Demographic Profiles of Regular User Groups of Finfish

Univariate Comparisons of Attitudinal Variables. The univariate comparsons of the means ($\bar{M}$) of the attitudinal variables for regular and irregular users of each type of finfish are given in Table 7. As explained when discussing t the semantic differential, respondents scored each attiudinal variable on a seven point scale. In coding the responses (which are set up in an alternate favorable-unfavorable and unfavorable-favorable bi-polar basis in the questionnaire to control position response bias), the most favorable point on each scale is assigned a value of one, while the least favorable point is assigned a value of seven. Group mean values, therefore, are interpreted as follows:

Group mean value	Interpretation
1.00 - 1.99	Extremely favorable
2.00 - 2.99	Quite favorable
3.00 - 3.99	Slightly favorable
4.00 (3.5 to 4.5 range)	Indifferent
4.01 - 4.99	Slightly unfavorable
5.00 - 5.99	Quite unfavorable
6.00 - 7.00	Extremely unfavorable

Fresh Finfish. The attitudinal mean values of regular

TABLE 4

UNIVARIATE COMPARISONS OF GROUP ATTITUDINAL MEANS FOR REGULAR AND IRREGULAR USERS OF FRESH, FROZEN UNPREPARED, AND FROZEN PREPARED FINFISH

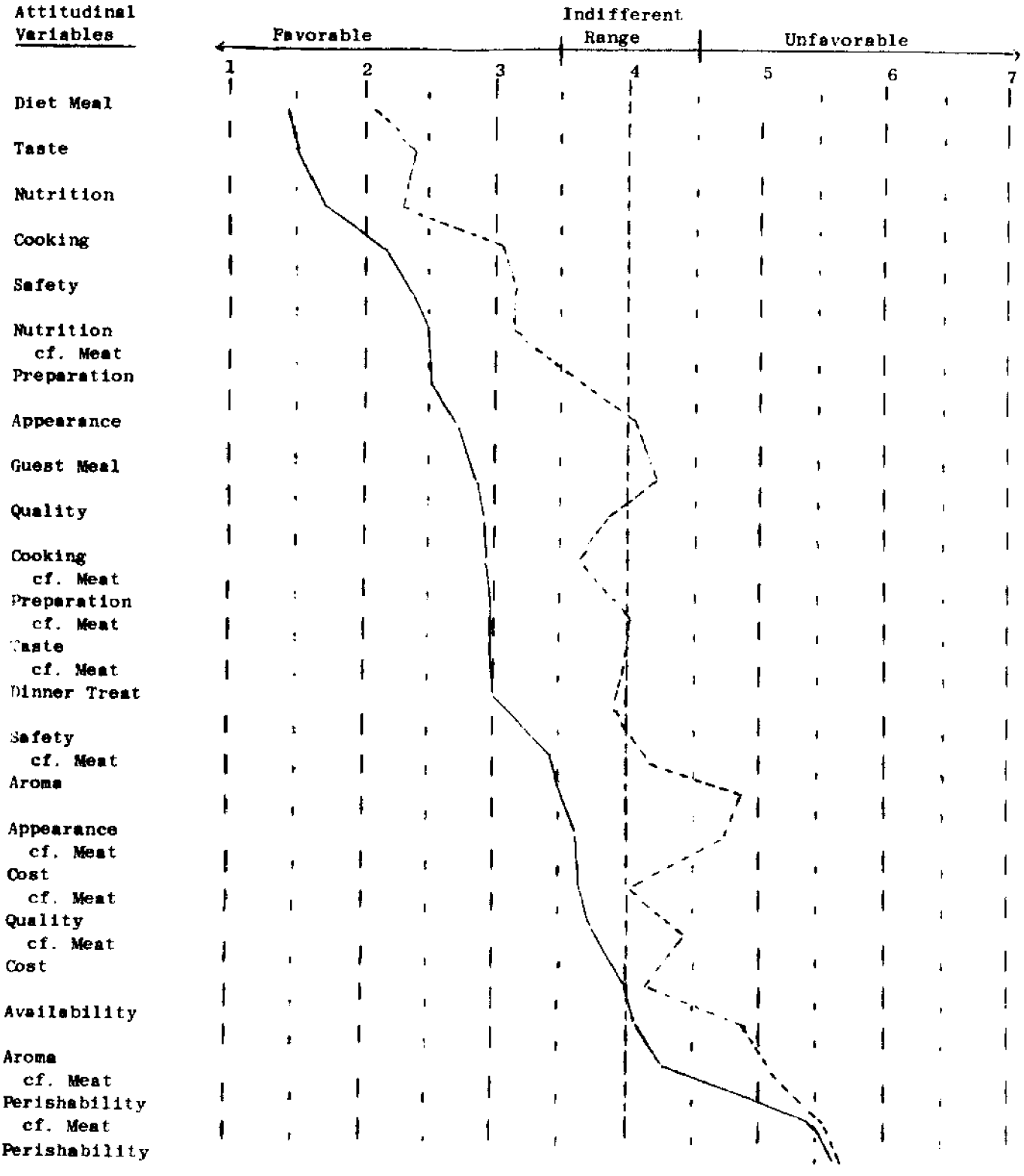
Attitudinal Variable	FRESH			FROZEN UNPREPARED			FROZEN PREPARED		
	Regular Users M	Irregular Users M	F Ratio	Regular Users M	Irregular Users M	F Ratio	Regular Users M	Irregular Users M	F Ratio
Taste	1.48	2.38	228.33	2.44	3.66	305.74	2.88	3.92	202.97
Taste cf. meats	2.96	4.00	165.21	3.94	4.72	112.08	4.26	5.00	98.28
Nutrition	1.67	2.28	91.91	2.31	2.90	82.61	2.90	3.30	34.20
Nutrition cf. meats	2.45	3.16	100.22	3.16	3.65	50.14	3.62	4.00	32.14
Cost	4.04	4.19	13.83	3.75	4.23	28.82	4.14	4.38	7.48
Cost cf. meats	3.67	4.08	21.88	3.42	4.02	54.18	3.84	4.16	15.30
Aroma	3.53	4.78	194.87	4.06	4.77	84.33	3.96	4.58	68.13
Aroma cf. meats	4.35	5.12	107.75	4.67	5.11	41.41	4.78	5.02	65.01
Perishability	5.64	5.67	0.16*	3.48	3.75	8.21	3.22	3.76	33.72
Perishability cf. meats	5.50	5.59	1.62*	4.09	4.33	8.65	3.87	4.30	27.39
Preparation	2.50	3.71	161.11	2.49	3.42	103.72	2.00	2.44	33.23
Preparation cf. meats	2.93	4.03	159.37	3.09	3.78	63.50	2.58	2.98	24.51
Cooking	2.01	3.01	171.29	2.29	3.05	89.58	2.00	2.39	30.51
Cooking cf. meats	2.85	3.66	103.42	2.99	3.64	67.66	2.63	2.98	21.80
Appearance	2.73	4.10	226.24	3.40	4.36	126.88	3.19	3.97	86.91
Appearance cf. meats	3.64	4.67	195.74	4.23	4.80	63.66	3.99	4.67	88.85
Quality	2.85	3.87	149.88	3.08	4.07	153.38	3.24	4.13	115.85
Quality cf. meats	3.76	4.47	94.52	3.98	4.57	75.65	4.00	4.56	65.71
Availability	4.09	4.91	35.16	2.63	2.86	7.06	2.19	2.37	10.38
Dinner treat	3.02	3.95	80.43	4.27	4.81	37.31	4.62	5.14	36.51
Guest meal	2.83	4.25	187.53	3.96	5.03	131.73	4.52	5.30	73.24
Diet meal	1.46	2.10	44.38	1.59	2.12	67.02	3.32	3.31	0.01*
Safety	2.30	3.16	122.05	2.45	3.22	101.22	2.74	3.30	48.22
Safety cf. meats	3.44	4.18	113.07	3.68	4.14	49.72	3.71	4.24	64.46

Source: Survey data and utilization of the MANOVA program.

*Indicates variables non-significant at 0.05 level.

FIGURE 1: ATTITUDINAL PROFILES OF REGULAR AND IRREGULAR USER GROUPS OF FRESH FINFISH

Scaled Attitudinal Mean Values



Source: Table 7.

and irregular consumers of fresh finfish presented in Table 7 are shown in scaled semantic differential form in Figure 1. From Figure 1, it is evident that:

1. Regular users rate fresh finfish more favorably on all attitudinal variables than irregular users.

2. Regular users rate fresh finfish slightly to extremely favorable on 19 of the 24 variables, whereas irregular users rate fresh finfish slightly to quite favorable on 10 variables.

3. The attitudinal mean values of irregular users are in the neutral range (3.5 to 4.5) for 50 per cent of the variables. Regular users, however, put only 30 per cent of the variables in the neutral range.

Turning to the F-ratios in Table 7, it can be seen that the univariate comparisons of group attitudinal means for regular and irregular users of fresh finfish results in signficant F-ratios for 22 of the 24 attitudinal variables. Both groups rate fresh finfish quite unfavorably on the two variables, perishability and perishability compared to meat. That is, the F-ratios for these variables are not significant at the .05 level.

The attitudinal variables with mean values in the 1.4 to 3.5 range for both groups, in descending order of favor, are:

Diet meal	Cooking
Taste	Safety
Nutrition	Nutrition compared to meat

Attitudinal variables scored favorably (1.4 - 3.5 range) by regular users but indifferently (3.5 - 4.5 range) by irregular users include the following:

Preparation	Cooking compared to meat
Appearance	Preparation compared to meat
Guest meal	Taste compared to meat
Quality	Safety compared to meat
Dinner treat	

The attitudinal variables with mean scores in the indifferent range (3.5 - 4.5) for both groups are as follows:

Cost
Cost compared to meat
Quality compared to meat

Lastly, the variables viewed indifferently (3.5 - 4.5) by the regular users of fresh finfish, but rated unfavorably (4.5 - 5.5) by the irregular users, are:

Aroma
Availability
Aroma compared to meat
Appearance compared to meat

Profile Inferences for Fresh Finfish. Several inferences concerning the consumption of fresh finfish may be drawn from these data. First, the profile of the regular users is skewed to the left on the attitudinal scales, while the profile of the irregular users tends to fall toward the middle. Regular users, consequently, view fresh finfish more favorably than do irregular users. Irregular users are less enthusiastic or more likely to be indifferent than the regular users.

Second, both groups rate fresh finfish quite favorably (1.4 - 3.5 range) on six variables. They agree fresh finfish is an excellent diet meal and tastes good. They further agree that fresh finfish is nutritious, and compares favorably with meat in nutrition, is easy to cook, and is safe to eat.

Third, one-half (12) of the variables have mean values either in the favorable (2.5 - 3.5) range or indifferent (3.5 - 4.5) range among regular users compared with indifferent (3.5 - 4.5) range mean values for these same variables among irregular users. These variables, then, may be rated somewhat unfavorably at best, and indifferently or somewhat unfavorably at worst. The characteristics of fresh finfish rated this way are ease of preparation, general appearance, and quality. The fact that respondents rate fresh finfish somewhat favorably or are indifferent in their attitude on these characteristics is meaningful because neither group believes fresh finfish is especially difficult to prepare, repugnant in appearance, or poor in quality. Similarly, regular users consider fresh finfish a guest meal and a dinner treat, whereas irregular users are indifferent; nonetheless, they do not summarily reject fresh finfish as a guest meal and dinner treat. The same may be said for fresh finfish in comparison to meat. Fresh finfish is not rated substantially inferior to meat in ease of cooking, preparation, quality, taste, safety, or cost. As a matter of fact, although the fish industry is concerned about the cost of fresh finfish, both the regular and irregular user groups are indifferent in their attitude regarding cost.

Fourth, irregular users rate the aroma and availability of fresh finfish unfavorably. In comparison to meat, irregular users also think fresh finfish is more offensive

in odor and appearance. Regular users, on the other hand, rate these characteristics somewhat favorably or indifferently. However, both groups agree quite strongly on the unfavorable characteristics of perishability and perishability in comparison to meat.

Frozen Unprepared Finfish. The attitudinal mean values of the regular and irregular consumers of frozen unprepared finfish are listed in Table 7. These are reproduced in scaled semantic differential form in Figure 2. The data in Figure 2 show:

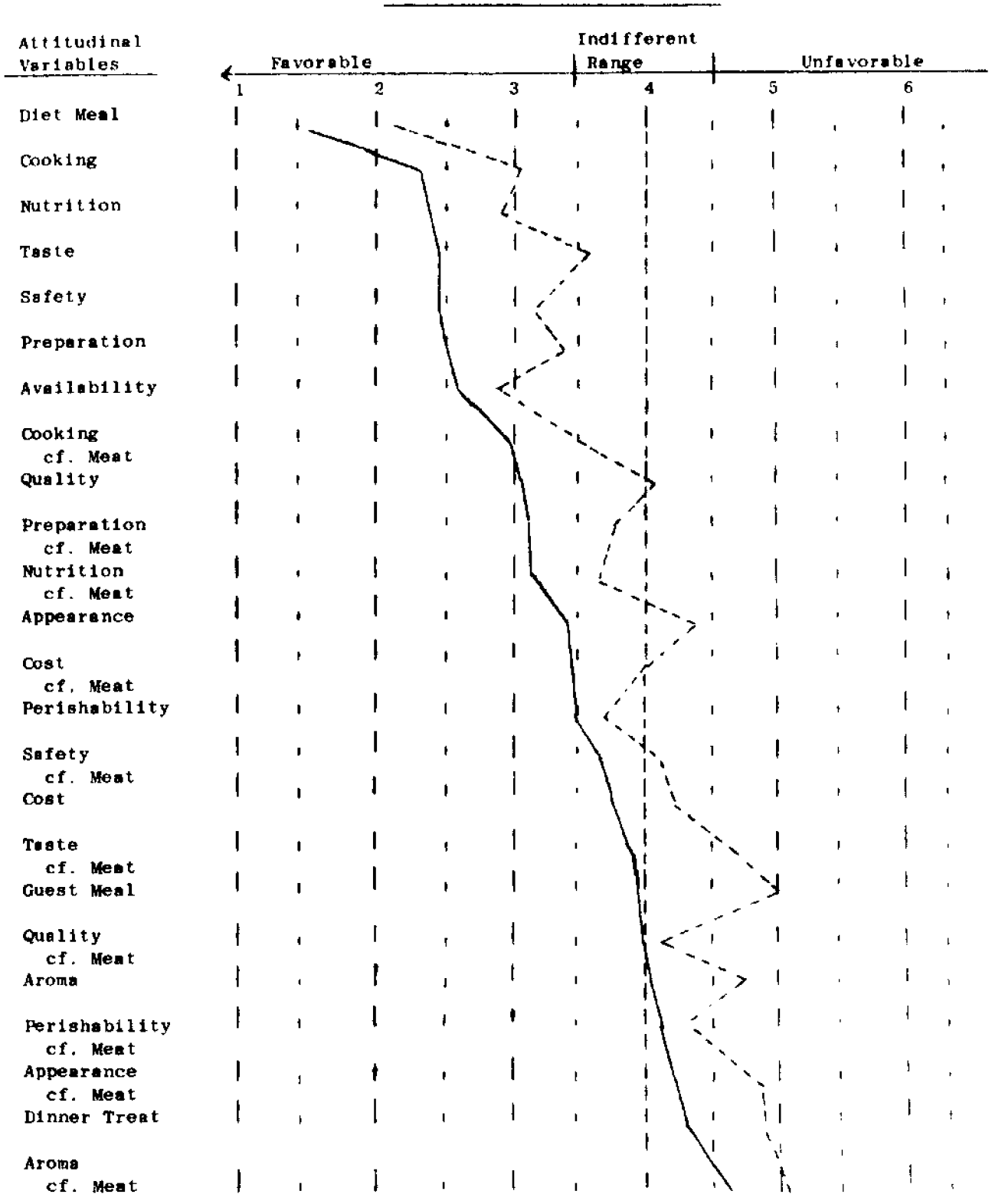
1. Like regular users of fresh finfish, regular users of frozen unprepared finfish rate the product better on all attitudinal variables than do irregular users.

2. Of the 24 attitudinal variables, 19 have mean scores that fall on the favorable side of the absolute indifferent mean value (4) for regular users of frozen unprepared finfish. By coincidence, these are the same as the mean scores for regular fresh finfish consumers. For the irregular user group, 11 of the 24 attitudinal variables are on the favorable side of the indifferent mean value (4).

3. Fifty per cent of the attitudinal variable scores of the irregular users also falls again within the indifferent or neutral range of mean values (3.5 - 4.5). However, a higher proportion of the mean scores (38 per cent) of regular frozen unprepared finfish users is in the indifferent range than is true for regular fresh finfish users (30 per cent).

The data in Table 7 show significant differences for every variable in the univariate comparisons of the group attitudinal means of regular and irregular users of frozen unprepared finfish. Significant F-ratios for 11 of the 24

FIGURE 2: ATTITUDINAL PROFILES OF REGULAR AND IRREGULAR USER GROUPS OF FROZEN UNPREPARED FINFISH



Source: Table 7.

variables result from differences in the degree of favorable ratings, while five are attributable to differences in the degree of unfavorable scores.

The attitudinal variables which both groups clearly classify as favorable (1.5 - 3.5 range), and which differ only in degree of favor, are:

Diet meal	Safety
Cooking	Preparation
Nutrition	Availability

Eight attitudinal variables are given favorable ratings in the 2.0 to 3.5 range by regular users but are given indifferent ratings in the 3.5 to 4.5 range by irregular consumers. They include:

Taste	Cooking compared to meat
Quality	Preparation compared to meat
Appearance	Nutrition compared to meat
Perishability	Cost compared to meat

Both groups have mean scores within the indifferent range (3.5 - 4.5) on four attitudinal variables:

Cost	Quality compared to meat
Safety compared to meat	Perishability compared to meat

The variables which fall within the indifferent range (3.5 - 4.5) among regular users and the unfavorable range among irregular users are:

Aroma	Taste compared to meat
Guest meal	Appearance compared to meat
Dinner treat	

Both groups give an unfavorable rating to the variable, aroma compared to meat.

Profile Inferences for Frozen Unprepared Finfish. General profiles of the regular and irregular users of frozen unprepared finfish are quite similar to those for fresh finfish. First, the regular user profile is skewed to the left on the attitudinal scales, although somewhat less so than regular fresh finfish users. The irregular user profile falls more in the middle of the attitudinal scale. Regular users, therefore, unmistakeably rate frozen unprepared finfish more favorably than irregular users.

Second, regular as well as irregular user groups think it is an excellent diet meal, nutritious, safe to eat, easy to prepare, easy to cook, and is readily available. Regarding these variables, the only difference in attitudinal scores between the two groups is one of degree. Regular users have higher favorable mean scores than the irregular users.

Third, regular users rate favorably the taste, quality, general appearance, and perishability characteristics of frozen unprepared finfish. The mean scores of irregular users, however, are in the indifferent range (3.5 - 4.5) on these characteristics. They also feel indifferent about the cost, nutritional value, ease of cooking, and preparation of frozen unprepared finfish in comparison to meat. The regular users, of course, think frozen unprepared finfish

compares quite favorably with meat on the bases of cost, nutritional value, preparation, and ease of cooking. The regular users obviously purchase frozen unprepared finfish because they rate the product favorably on these characteristics. The indifference in attitudes of irregular users indicates they are impartial to the product in terms of these particular variables.

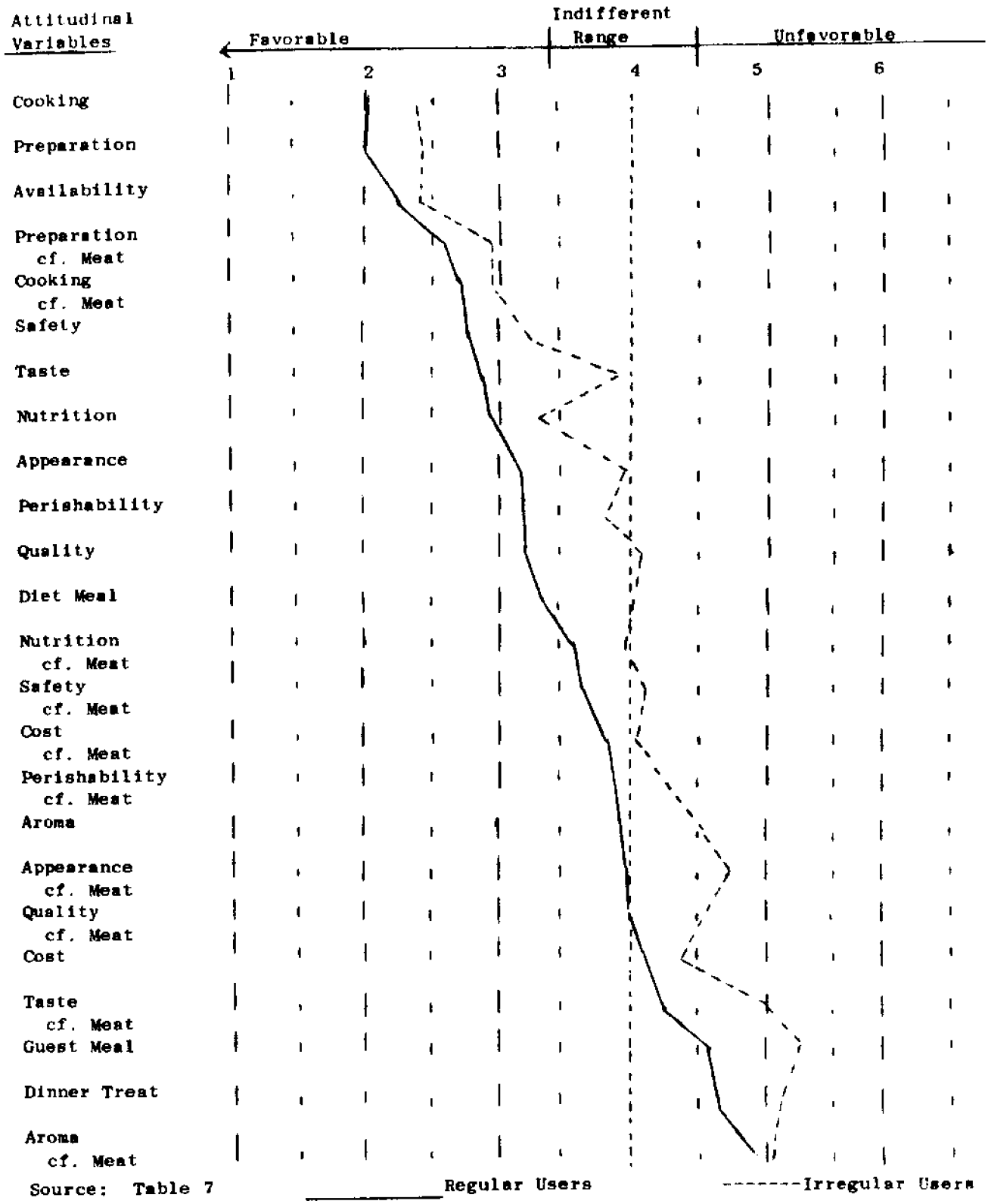
Fourth, both groups are indifferent to the cost of frozen prepared finfish, as well as to its safety, quality, and perishability compared to meat. One may infer, therefore, that neither group thinks the cost of frozen unprepared finfish is too high or that meat is safer to eat, less perishable, or of better quality than frozen unprepared finfish.

Fifth, neither group considers frozen unprepared finfish a real dinner treat or a guest meal. Similarly, neither group thinks frozen unprepared finfish tastes better, looks better, or smells better than meat. The irregular users, of course, have stronger negative attitudes on these variables than the regular users do.

Frozen Prepared Finfish. The attitudinal profiles of regular and irregular consumers of frozen prepared finfish are plotted in scaled semantic differential form in Figure 3. The values of the group means are given in Table 7. From the profiles in Figure 3, it is evident that:

1. Regular users of frozen prepared finfish rate the product more favorably than irregular users on 23 of the 24 attitudinal variables. On the

FIGURE 3: ATTITUDINAL PROFILES OF REGULAR AND IRREGULAR USER GROUPS OF FROZEN PREPARED FINFISH



Source: Table 7

remaining variable, both groups evaluate the diet meal characteristic of frozen prepared finfish somewhat favorably at 3.3 on the favorable scale.

2. Seventeen of the 24 variables are assigned values on the favorable side of the indifferent mean value (4) by regular users, whereas only 10 out of 24 variables are so rated by irregular users.

3. Nine (38 per cent) of the variables for both groups fall in the indifferent range (3.5 - 4.5).

Univariate comparisons of the attitudianl group means produce significant F-ratios for 23 of the 24 attitudinal variables. The only variable for which there is no statistically significant difference in rating between groups is diet meal. Once again, many of the significant F-ratios result from differences in the strength of the favorable ratings.

Both groups rate frozen prepared finfish in the highly favorable to definitely favorable range (2.0 - 3.5) on eight variables. In descending order of favorability, they are:

Cooking	Cooking compared to meat
Preparation	Safety
Availability	Nutrition
Preparation compared to meat	Diet meal

Four attitudinal variables are assigned favorable values (2.5 - 3.5) by regular users, but are rated in the indifferent range (3.5 - 4.5) by irregular users. These are:

Taste	Perishability
Appearance	Quality

Both groups place the five variables listed below in the indifferent range (3.5 - 4.5):

Nutrition	Safety compared to meat
Cost	Cost compared to meat
	Perishability compared to meat

The variables rated in the indifferent range (3.5 - 4.5) by regular users and the definitely unfavorable range (4.5 - 5.0) by irregular users are:

Aroma	Quality compared to meat
Appearance	Taste compared to meat

Both groups assign unfavorable ratings (4.5 - 5.5) to the variables:

Guest meal
Dinner treat
Aroma compared to meat

Profile Inferences for Frozen Prepared Finfish. The general profiles of regular and irregular frozen prepared finfish users are very similar to those for fresh and frozen unprepared finfish. That is, the regular user profile is skewed to the left (favorable) on the attitudinal scales, but less so than the profiles of regular fresh and frozen unprepared finfish consumers. The irregular user profile falls essentially in the middle range on the scales, indicating they view frozen prepared finfish less favorably than regular users.

The second inference that may be drawn from these data is the fact both groups give strong favorable ratings to frozen prepared finfish as a product that is easy to prepare and cook as well as easy to prepare and cook in comparison

to meat. They further agree that frozen prepared finfish is readily available, safe to consume, quite nutritious, and a widely recognized diet meal.

Third, the regular users rate the taste, appearance, quality, and perishability of frozen prepared finfish favorably (2.5 - 3.5), whereas the irregular users are impartial or indifferent on these characteristics. Since they are indifferent, they are not likely to consider the taste, appearance, quality, and perishability of frozen prepared finfish unpleasant.

Fourth, because both groups are indifferent to the nutritional and cost factors, it may be said that the cost and nutritional content are not deterrents to the purchase of frozen prepared finfish. Both groups, moreover, are impartial about the safety, perishability, and cost of frozen prepared finfish in comparison to meat.

Fifth, regular users tend to be impartial about the aroma and appearance of frozen prepared finfish, as well as its quality and taste compared to meat. Irregular users, however, may not purchase the product because they definitely think the aroma and appearance is unfavorable. In comparison to meat, the quality and taste of frozen prepared finfish is also rated unfavorably by irregular users.

Sixth, neither group believes frozen prepared finfish is a dinner treat or that it should be served as a guest meal. In addition, both groups rate the aroma of frozen

prepared finfish quite unfavorably in comparison to the aroma of meat.

Summary of Attitudinal Profiles of Regular and Irregular Finfish User Groups

The following points highlight the conclusions which may be drawn from the ratings of the 24 attitudinal variables by the 1,730 respondents grouped as regular or irregular users of fresh, frozen unprepared, and frozen prepared finfish.

1. Overall, regular users of all three types of finfish rate these products more favorably than the irregular users.

2. Univariate comparisons of the means for each attitudinal variable between regular and irregular users produce statistically significant differences for 69 of the 72 comparisons. Most of these differences, however, are due to the degree of favorability assigned to a variable by the regular versus irregular user groups rather than to opposite opinions or ratings of the variables (e.g., very good vs. very bad). This indicates regular and irregular user groups of each type of finfish, generally speaking, have similar attitudes towards the respective types of finfish. Differences in their attitudes are essentially differences in degree of approval or disapproval

3. The profiles further show that the respondents rate fresh finfish more favorably than either frozen

unprepared or frozen prepared finfish. Of the two frozen varieties, frozen unprepared finfish is rated more favorably than frozen prepared finfish.

4. Regular and irregular user groups rate fresh, frozen unprepared, and frozen prepared finfish in the highly favorable to definitely favorable range (1.4 - 3.5) as a diet meal, a nutritious menu item, an easily cooked food, and a product safe to eat. This latter factor shows that the public in general (those who eat finfish regularly as well as those who do not) is not particularly concerned about contamination, since all forms of finfish are rated favorably by all groups in terms of safety.[7] It is inappropriate, therefore, to point to the fear of pollution as a reason why consumption has not increased per capita.

5. It is further evident that the general public recognizes that finfish is nutritious, easy to cook, and recommended for those concerned about their weight. Promotional programs in the future should deal more with other attributes of finfish not so widely recognized.

6. Interestingly, regular and irregular users rate the taste of fresh finfish very favorably, but only the regular users of frozen unprepared and frozen prepared finfish rate these fish so.

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[7]See also J. Steven Kelly, Attitudes About Water Pollution and Fish Consumption (Working Paper), Kent, Ohio: Center for Business and Economic Research, 1972.

7. All groups appraise the ease of prepatation of frozen unprepared and frozen prepared finfish quite favorably in contrast to fresh finfish, which only the regular user group rates favorably. Undeniably, this is true for prepared frozen fish sticks in comparison with whole fresh finfish. On the other hand, fresh fish fillets actually are easier to prepare than frozen unprepared fillets. The latter requires thawing in the preparation process.

8. Likewise, all groups recognize that frozen finfish is readily available at retail grocery stores, whereas fresh finfish is harder to find. As a matter of fact, even the regular fresh finfish user group rates availability on the indifferent but a trifle unfavorable segment of the attitudinal scale. Although greater availability might possibly increase sales, this may be difficult to attain because many wholesale distributors[8] and retailers[9] prefer handling frozen rather than fresh fish.

9. Another finding is the fact that the quality of all three types of finfish is viewed favorably by regular.

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[8]Leonard J. Konopa, Survey of Wholesalers Handling Fish in Cuyahoga and Summit Counties, Ohio, (Kent, Ohio: Institute for 21st Century Business, 1973) pp. 81-84.

[9]Leonard J. Konopa, Survey of Selected Retail Food Stores Handling Fish in Cuyahoga and Summit Counties, Ohio, (Kent, Ohio: Institute for 21st Century Business, 1973) pp. 42-45.

user groups and somewhat indifferently by irregular user groups. Fresh finfish is given the highest ranking, followed by frozen unprepared and prepared finfish in each instance. This is quite thought provoking because it indicates the public is not adverse to consuming finfish on the basis of quality despite the fact that fresh finfish is a highly perishable item and frozen finfish is always in danger of thawing - especially in the hands of consumers who may not handle or refrigerate it correctly.

10. In terms of perishability, fresh finfish has the least favorable rating in the study. Conversely, frozen finfish is scored favorably. An issue that possibly deserves further study is the fact that regular users actually score perishability of prepared frozen finfish higher than unprepared frozen finfish.

11. The respondents' attitudes toward the cost of finfish may be identified as impartial since the ratings of regular and irregular user groups are in the indifferent range (3.5 - 4.5), albeit somewhat on the unfavorable portion of the rating scale (with the exception of regular consumers of frozen unprepared finfish). This differs from the attitude of fishing industry spokesmen who push finfish as an inexpensive form of protein for the homemaker.

12. Regular finfish users are indifferent to the aroma of finfish, while irregular users are not indifferent. The regular fresh finfish user group is at the upper end of

the indifferent range, followed by the regular user group of frozen finfish in the middle of the indifferent range. Irregular users rate all three types unfavorably on aroma, with the aroma of frozen prepared finfish slightly less offensive than that of fresh or frozen unprepared finfish. The fish industry, consequently, is faced with the enigma that taste is scored much more favorably by all groups than aroma, which is not viewed favorably - a dilemma that appears contradictory in nature.

13. Even though aroma is not rated favorably, regular user groups rate the appearance of fresh and frozen finfish quite favorably. The irregular user group, on the other hand, is inclined to be indifferent to the appearance of botl fresh and frozen finfish.

14. Regular users rate fresh finfish high as a guest meal or dinner treat. Regular users of frozen unprepared finfish are less enthusiastic about the product as a guest meal or dinner treat, since their ratings fall in the middle or upper end of the indifferent range. None of the regular users of frozen prepared finfish think it is a dinner treat or guest meal. Irregular users of fresh finfish are in the indifferent range compared to irregular users of frozen unprepared and prepared finfish. The latter two groups view these products quite unfavorably as dinner treats or guest meals. Curiously, respondents who use finfish regular place higher scores on finfish as a guest meal than as a

dinner treat. Conversely, irregular users rate finfish as a dinner treat less critically than they rate it as a guest meal. When featuring recipes for finfish as a guest meal, the recipes should obviously focus on fresh finfish. Perhaps home economists could change the unfavorable attitude toward frozen prepared finfish as a guest meal or dinner treat by creating new recipes.

15. When compared to meat, fresh finfish, frozen unprepared, and frozen prepared finfish rank quite favorably in ease of preparation, cooking, and nutrition by regular user groups. They are ranked slightly less favorably by the irregular user groups. All finfish, however, generally comes out second best in aroma and perishability when compared to meat. In appearance, quality, safety, and cost, regular users typically rate each type of finfish in the lower half of the indifferent range (3.5 to 4.0) in comparison to meat. The irregular user groups put cost and safety compared to meat in the upper part of the indifferent range (4 to 4.24), while appearance and quality are considered unfavorable (4.5 to 4.8). It was earlier reported that all regular users, as well as irregular fresh finfish users, rate the taste of finfish favorably, whereas irregular users of frozen unprepared and prepared finfish are somewhat indifferent. In comparison to meat, however, only the regular fresh finfish group thinks it compares quite favorably in taste. The regular user groups of frozen unprepared and prepared finfish

have mean scores of 3.94 and 4.26, respectively, which fall in the indifferent range. The irregular user group of fresh finfish is indifferent, while the latter two irregular user groups rate the taste of frozen unprepared and prepared finfish quite unfavorably in comparison to meat.

Overall, the regular user groups consider fresh or frozen finfish similar to or better than meat on eight of the ten comparisons. The two unfavorable exceptions are aroma and preparation. Among the irregular user groups, however, the ratings show these respondents generally consider finfish similar to meat at best in preparation, cooking, nutrition, safety, and cost, but worse than meat in appearance, quality, aroma, perishability, and taste (in frozen). Undeniably, if consumption per capita is to increase, the critical attitudes must be overcome regarding fresh or frozen finfish in comparison to meat. Since approximately two-thirds of the respondents are irregular users, they represent the potential consumers who must be motivated to become regular users.

Univariate Comparisons of Group Demographic Means for Regular and Irregular User Groups of Fresh, Frozen Unprepared, and Frozen Prepared Finfish

Group Demographic Means and Univariate Comparisons. The group means and univariate comparisons (F-ratios) of the demographic variables for regular and irregular user groups of the three types of finfish are presented in Table 8. The codes utilized by the respondents are shown by the subscripts (a to f) at the bottom of the table. Because the

TABLE 8

UNIVARIATE COMPARISONS OF GROUP DEMOGRAPHIC MEANS FOR REGULAR AND IRREGULAR USERS OF FRESH, FROZEN UNPREPARED, AND FROZEN PREPARED FINFISH

Demographic Variable	Fresh			Frozen Unprepared			Frozen Prepared		
	Regular Users $\bar{M}$	Irregular Users $\bar{M}$	F Ratio	Regular Users $\bar{M}$	Irregular Users $\bar{M}$	F Ratio	Regular Users $\bar{M}$	Irregular Users $\bar{M}$	F Ratio
Age of housewife[a]	3.66	3.19	41.68	3.42	3.34	1.20*	3.26	3.41	4.32
Age of head of household[a]	3.93	3.49	42.12	3.85	3.53	11.60	3.52	3.71	6.85
Number of children at home[b]	2.20	2.29	1.00*	2.22	2.28	0.25*	2.48	2.14	14.70
Age category of children[c]	2.49	2.31	10.63	2.50	2.30	13.52	2.42	2.34	2.19*
Size of household[d]	2.38	2.47	4.72	2.50	2.41	4.79	2.63	2.35	37.42
Education of head of household[e]	3.28	3.50	14.46	3.57	3.34	13.70	3.44	3.41	0.30*
Income[f]	4.63	4.89	7.02	5.11	4.64	22.69	4.83	4.77	0.59*
Protestant or not[g]	0.54	0.57	1.36*	0.50	0.58	10.48	0.48	0.59	20.00
Catholic or not[g]	0.36	0.38	0.43*	0.40	0.36	2.60*	0.46	0.33	26.75
Jewish or not[g]	0.07	0.03	15.62	0.06	0.03	7.11	0.03	0.05	2.22*
White or not[g]	0.81	0.93	67.76	0.90	0.88	0.89*	0.88	0.89	0.12*
Black or not[g]	0.18	0.05	70.64	0.09	0.11	2.14*	0.10	0.10	0.12*

[a]Adult's Age Categories
(1) Under 26
(2) 26 to 35
(3) 36 to 45
(4) 46 to 55
(5) 56 to 65
(6) Over 65

[b]Actual Number

[c]Children's Age Categories
(1) Pre-school (age 1-5)
(2) Elementary (age 6-12)
(3) Teen (age 13-19)

[d]Household Size Categories
(1) One person
(2) 2 to 3 persons
(3) 4 to 5 persons
(4) 6 to 7 persons
(5) 8 to 9 persons
(6) 10 persons

[e]Education Categories
(1) Elementary
(2) Some high school
(3) High School
(4) Some College
(5) College

[f]Income Categories
(1) Under $4,000
(2) $4,000 - 5,999
(3) $6,000 - 7,999
(4) $8,000 - 9,999
(5) $10,000 - 11,999
(6) $12,000 - 13,999
(7) Over $14,000

[g]Dummy variable code: 1 or 0

*Variables non-significant at .05 level.

Source: Survey data.

coding of replies involving demographic data is done in a left to right fashion, larger mean figures indicate a higher demographic value. For example, the higher the mean value for income, the larger the group's average income. Unlike the semantic differential, there are no indifferent or impartial values in the demographic data.

Demographic variables regarding race and religion present a special problem because they are qualitative rather than quantitative in nature. Accordingly, they are treated dichotomously, e.g., respondents are placed in one category or another as either Protestant (1) or not Protestant (0).

Fresh Finfish. The data in Table 8 show that nine of the 12 demographic variables have significant F-ratios in the univariate analysis of group mean differences for regular and irregular users of fresh finfish. The demographic variables not significantly different between the two groups are number of children, Protestant or not, and Catholic or not.

In general, it may be said that regular users of fresh finfish are older, have fewer but older children, have smaller households, have less education, and have lower incomes than irregular users. The regular user group also tends to include more Jews, fewer whites, and more blacks than the irregular user group.

Frozen Unprepared Finfish. The data in Table 8 further show that seven of the 12 demographic variables have

significant F-ratios in the univariate comparison of group mean differences for regular and irregular users of frozen unprepared finfish. The five demographic variables which are not significantly different between the regular and irregular user groups are:

Age of housewife	Catholic or not
Number of children at home	White or not
	Black or not

Interpretation of the mean values for significant demographic variables indicates that regular users of frozen unprepared finfish typically have older heads of households, older children, larger households, more education, and higher incomes than the irregular user group. Regular users also tend to include fewer Protestants and more Jews than the irregular user group.

Frozen Prepared Finfish. Six of the 12 demographic variables are significantly different in the univariate comparison of group means for regular and irregular users of frozen prepared finfish. The non-significant demographic variables between regular and irregular users of frozen prepared finfish are:

Age category of children	Jewish or not
Education of head of household	White or not
	Black or not

The demographic variables with significant differences suggest that regular users of frozen prepared finfish tend to be younger, have more children, and have larger households

than irregular users. Moreover, the regular user group tends to include more Catholics and fewer Protestants than the irregular user group.

Summary of Comparisons of Group Demographic Means

The finding and inferences that may be drawn from the demographic profiles of the regular and irregular user groups center around seven types of variables.

Age. The age of the housewife, as well as that of the head of household, is highest for the fresh finfish regular user group, and lowest for the frozen prepared finfish regular user group. Conversely, among the irregular user groups, it is lowest for fresh finfish and highest for frozen prepared finfish. This indicates that the older families prefer fresh finfish, or perhaps frozen unprepared finfish, whereas the younger families choose frozen prepared finfish that one just heats and eats. Because approximately 50 per cent of the population in the United States is under 25 years of age (and a substantial number of these people will be forming new households in the near future), the consumption of frozen prepared finfish is more likely to increase in the near future than is the consumption of frozen unprepared or fresh finfish.

Children. The regular frozen prepared user group also has more children, as well as younger children, than either the regular frozen unprepared or fresh finfish user groups. The pattern for the irregular user groups is opposite to that of the regular user groups. Irregular users of frozen

prepared finfish, for example, have fewer children, as well as the oldest children among the irregular user groups.

Size of household. The pattern found for the number of children is further reflected in the size of household data. The regular user group of frozen prepared finfish has the largest size of household, while the regular fresh finfish group has the smallest. Examination of the group means of the irregular users reveals that the irregular frozen prepared finfish group has the smallest size of household, and the fresh finfish group has the largest household among irregular users. These data provide additional support for the observation that the younger families are the regular purchasers of frozen prepared finfish, in contrast to the older, smaller families that prefer fresh or unprepared frozen finfish.

Education of head of household. It is interesting to note that all of the group means show an education level somewhat beyond high school. Among the regular user groups, fresh finfish users have the least education, frozen prepared finfish users have the intermediate amount, and frozen unprepared finfish users have the highest education. For the irregular user groups, opposite levels of education are evident. Irregular fresh finfish consumers have the highest education level, for instance, in contrast to the lowest level of the regular users. Similarly, irregular users of frozen prepared finfish fall at the intermediate educational level,

as do the regular users. As a matter of fact, there is no significant difference in their levels of education. Lastly, the irregular frozen unprepared finfish consumers have the lowest educational score, although regular users have the highest educational mean value. If this pattern holds in the future, consumers will use more frozen finfish (unprepared and prepared) than fresh finfish as the educational level of the nation rises.

Income. The mean family income figures in Table 8 range between $9,200 and $10,200 for the respective regular and irregular user groups. An identical pattern to that for education of the head of household is found in terms of income. This is not unusual, since level of education frequently determines level of income. Regular users of fresh finfish report the lowest level of income, while irregular users have the highest income among the irregular user groups. Both groups of regular and irregular users of frozen prepared finfish have an intermediate level of income, while the income level of regular frozen unprepared finfish consumers is the highest and that of irregular frozen unprepared finfish consumers is the lowest. Once again, it is evident that frozen fish consumption will increase proportionally at a greater rate than fresh finfish, if this pattern holds, as income rises.

Religion. The demographic data relating to religion show Jews are more likely to consume regularly fresh and

frozen unprepared finfish than frozen prepared finfish. Catholics, however, consume frozen prepared and unprepared finfish more regularly than fresh finfish. Lastly, Protestants tend to consume fresh finfish and frozen unprepared finfish somewhat more regularly than frozen prepared finfish. This finding suggests that the Jews enjoy preparing and cooking their own finfish; the Catholics prefer the convenience of frozen finfish, particularly the heat and eat variety; and the Protestants seem ambivalent although somewhat inclined toward fresh and frozen unprepared finfish.

Race. Blacks are much more likely to consume fresh finfish regularly than either frozen unprepared or frozen prepared finfish. Regular users among the whites, on the other hand, are more likely to consume frozen unprepared and prepared finfish instead of fresh finfish.

Attitudinal and Demographic Profiles of Regular and Irregular User Groups of Shellfish

Univariate Comparisons of Attitudinal Variables. The two types of data make up Table 9. First, the group means ($\bar{M}$) of the regular and irregular user groups of fresh, frozen unprepared, and frozen prepared shellfish for each of the attitudinal variables are presented. In total, there are 144 group mean scores in the table. Second, the univariate comparisons (F-ratios) for significant differences in the mean scores of each attitudinal variable between the regular

TABLE 9

UNIVARIATE COMPARISONS OF GROUP ATTITUDINAL MEANS FOR REGULAR AND IRREGULAR USERS OF FRESH, FROZEN UNPREPARED, AND FROZEN PREPARED SHELLFISH

Attitudinal Variable	Fresh			Frozen Unprepared			Frozen Prepared		
	Regular Users $\bar{M}$	Irregular Users $\bar{M}$	F Ratio	Regular Users $\bar{M}$	Irregular Users $\bar{M}$	F Ratio	Regular Users $\bar{M}$	Irregular Users $\bar{M}$	F Ratio
Taste	1.59	2.64	130.70	2.37	3.35	107.38	2.76	3.69	116.20
Taste cf. meats	2.76	3.79	104.45	3.56	4.27	50.84	3.95	4.52	35.61
Nutrition	1.95	2.52	48.40	2.37	2.91	39.18	2.81	3.23	24.05
Nutrition cf. meats	2.75	3.30	47.12	3.23	3.61	17.62	3.35	3.89	42.12
Cost	5.58	5.38	1.49*	5.14	5.23	1.18*	5.21	5.20	0.10*
Cost cf. meats	5.37	5.10	4.07	4.89	4.97	0.04*	4.90	4.97	0.14*
Aroma	3.58	4.39	56.60	3.88	4.40	25.85	3.71	4.38	49.30
Aroma cf. meats	4.16	4.82	35.87	4.42	4.83	19.96	4.25	4.80	35.44
Perishability	5.42	5.40	0.51*	3.40	3.72	6.50	3.39	3.68	6.63
Perishability cf. meats	5.43	5.26	0.89*	4.10	4.19	1.20*	3.85	4.19	8.51
Preparation	2.78	3.71	67.88	2.65	3.50	47.36	2.10	2.67	33.26
Preparation cf. meats	3.28	4.01	50.85	3.11	3.85	38.70	2.60	3.15	29.88
Cooking	2.43	3.33	81.42	2.30	3.25	71.99	2.04	2.66	42.31
Cooking cf. meats	3.14	3.71	42.29	3.00	3.68	40.02	2.61	3.14	31.82
Appearance	2.62	3.75	107.12	3.10	4.01	65.85	3.14	3.78	39.00
Appearance cf. meats	3.46	4.31	90.04	3.87	4.48	40.51	3.75	4.94	51.89
Quality	3.03	3.66	44.12	3.08	3.81	47.32	3.13	3.91	65.93
Quality cf. meats	3.84	4.22	26.51	3.91	4.29	21.44	3.80	4.36	54.06
Availability	4.89	4.75	4.28	2.66	3.06	11.71	2.25	2.75	23.19
Dinner treat	2.27	3.23	59.44	3.01	3.83	41.13	3.54	4.16	26.17
Guest meal	2.31	3.43	76.07	2.80	4.06	87.05	3.60	4.49	52.01
Diet meal	1.83	2.25	23.12	1.93	2.38	19.14	3.30	3.39	0.79*
Safety	2.38	2.97	41.57	2.51	3.05	27.56	2.70	3.15	26.25
Safety cf. meats	3.47	3.97	41.69	3.52	4.00	31.20	3.57	4.08	38.08

*Variables non-significant at .05 level.

Source: Survey data

and irregular user groups are given for each type of shellfish. The results are discussed in the same manner as they were for finfish.

Fresh Shellfish. The attitudinal mean scores of the groups of regular and irregular users of fresh shellfish from Table 9 are reproduced in scaled semantic differential form in Figure 4. Examination of Figure 4 shows several distinctive attributes associated with the profiles of regular and irregular fresh shellfish users.

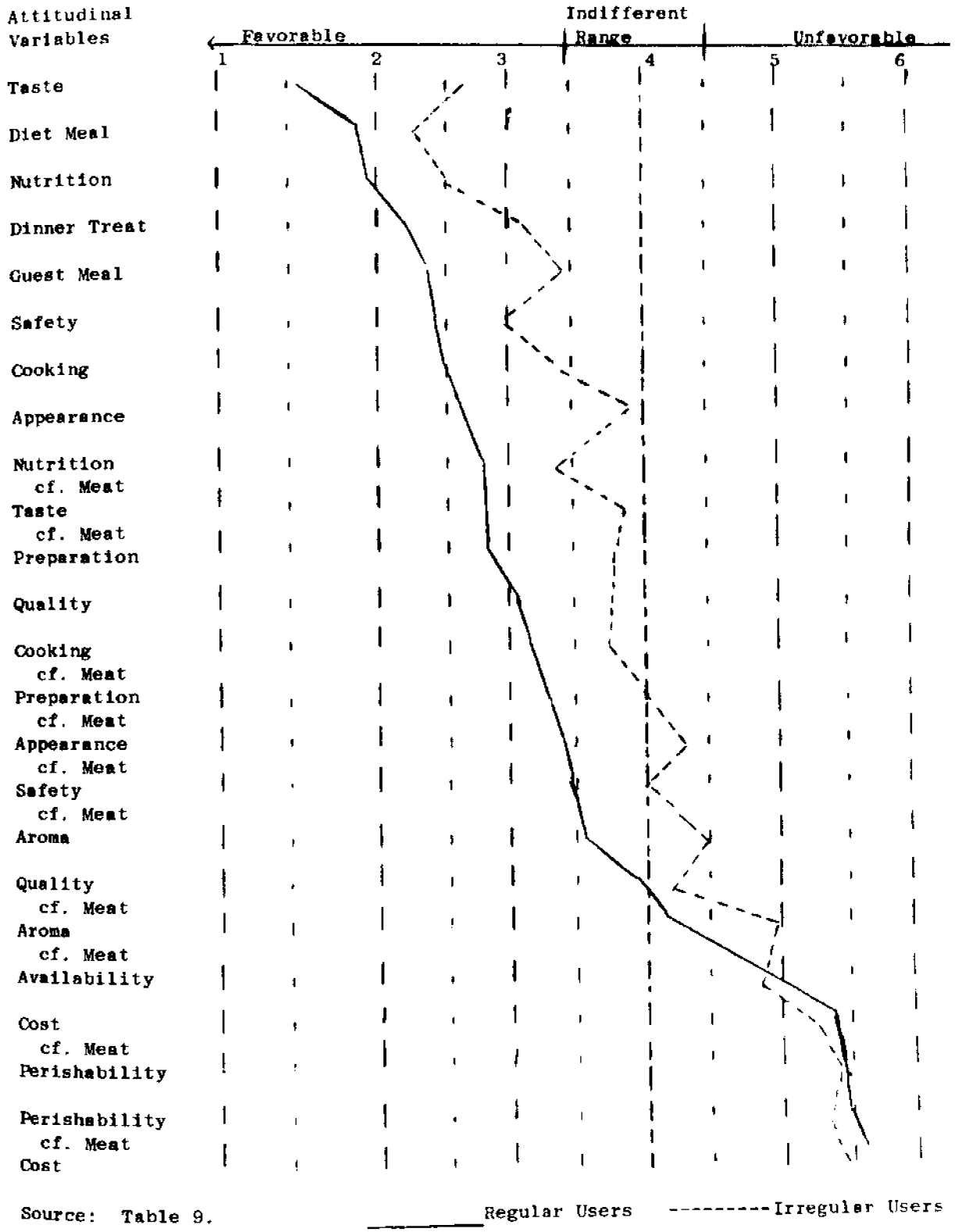
1. When regular and irregular users rate fresh shellfish favorably on an attribute, regular users rate it more favorably than irregular users. Conversely, when regular and irregular users rate a variable as distinctly unfavorable, the regular users rate it more unfavorably than the irregular users.

2. Regular users rate fresh shellfish favorably on more variables than irregular users.

3. The attitudinal mean values of regular users are in the neutral range (3.5 to 4.5) for three (12 per cent) of the variables. Irregular users put ten (40 per cent) of the variables in the neutral range.

The F-ratios in Table 9 disclose that in 21 of the 24 attitudinal variables, there is a significant difference between the regular and irregular user groups of fresh shellfish. Both groups rate cost, perishability, and perishability compared to meat quite unfavorably, with little difference in their scores on these variables.

FIGURE 4 ATTITUDINAL PROFILES OF REGULAR AND IRREGULAR USER GROUPS OF FRESH SHELLFISH



Source: Table 9.

The attitudinal variables with mean values in the very favorable to definitely favorable range (1.5 to 3.5) for both groups are:

Taste	Dinner Treat
Diet meal	Guest meal
Nutrition	Cooking
Safety	Nutrition compared to meat

Attitudinal variables scored as definitely favorable (2.5 to 3.5) by regular users, but somewhat indifferently by irregular users (that is, the upper end of the indifference range at 3.5 to 4.0 except appearance compared to meat), include:

Appearance	Cooking compared to meat
Preparation	Preparation compared to meat
Quality	Appearance compared to meat
Taste compared to meat	Safety compared to meat

Attitudinal variables that fall in the upper end of the indifferent rate (3.5 to 4.0) according to regular users, but are in the lower end of the indifferent range (4.0 to 4.5) according to irregular users, are:

Aroma
Quality compared to meat

The attitudinal variable placed in the lower end of the indifferent range (4.0 to 4.5) by regular users, but considered definitely unfavorable (4.5 to 5) by irregular users, is:

Aroma compared to meat

The last group of attitudinal variables that comprise the quite unfavorable category (4.5 to 6) according to the ratings of both groups of users, are:

Availability	Perishability
Cost	Perishability compared to meat
Cost compared to meat	

Profile Inferences for Fresh Shellfish. First, the general profiles of the two user groups show irregular users are not quite as enthusiastic about the favorable attributes of fresh shellfish, nor are they quite as critical of the unfavorable characteristics as the regular users.

Second, both groups rate fresh shellfish very favorably to quite favorably (1.5 to 3.5) on eight variables. They agree that fresh shellfish tastes good, is a dinner treat, and is an appropriate guest meal. They further agree that fresh shellfish is easy to cook and quite nutritious on its own as well as in comparison to meat. Both groups consider fresh shellfish a safe item to eat and a very favorable diet meal.

Third, regular users rate fresh shellfish quite favorably (2.5 to 3.5) on eight additional attributes, while the irregular users are somewhat indifferent although slightly favorably inclined (3.5 to 4.0) on these variables. The appearance, ease of preparation, and quality of fresh shellfish are rated this way. The five other variables rated similarly are taste, appearance, safety, ease of preparation, and cooking characteristics of fresh shellfish in comparison to meat.

Fresh shellfish, accordingly, is viewed quite favorably in comparison to meat on these characteristics by regular users, and on par with meat by irregular users.

Fourth, the aroma of fresh shellfish, aroma compared to meat, and quality compared to meat are treated indifferently by regular users and indifferently to unfavorably by irregular users. While these characteristics cannot be considered strong reasons for not buying the product, they do indicate that people consider the aroma of fresh shellfish unpleasant and seem to think the quality of fresh shellfish may not be on a par with meat.

Fifth, both groups strongly agree that fresh shellfish is not readily available, is costly in itself as well as in comparison to meat, and it perishes readily, even more so than meat. The unfavorable attitude toward these characteristics may deter regular users from purchasing more fresh shellfish than they do. It may also explain why irregular users have not become regular users given that they generally evaluate the other characteristics of fresh shellfish favorably.

Frozen Unprepared Shellfish. Each of the attitudinal mean values of the regular and irregular user groups of frozen unprepared shellfish are drawn in attitudinal scale form in Figure 5. The two profiles in Figure 5 exhibit three distinct characteristics:

1. The regular user group rates frozen unprepared shellfish better than the irregular user group on all characteristics.

2. Twenty of the 24 attitudinal variables (85 per cent) have mean scores that are to the left of the midpoint indifferent value (4) on the favorable side of the scales for the regular user group. For the irregular user group, 13 attitudinal variables (54 per cent) are rated in a comparable manner.

3. The scores on seven attitudinal variables for the regular group fall within the 3.5 to 4.5 indifferent range in contrast to the irregular user group with 14 attitudinal variables in the indifferent range.

In accordance with the F-ratios of the univariate comparisons in Table 9, 21 of the 24 variables are significantly different in mean value between the regular and irregular user groups. The three variables not statistically different in their scores between regular and irregular user groups of frozen unprepared shellfish are perishability compared to meat, cost, and cost compared to meat. These factors are not viewed favorably by either group.

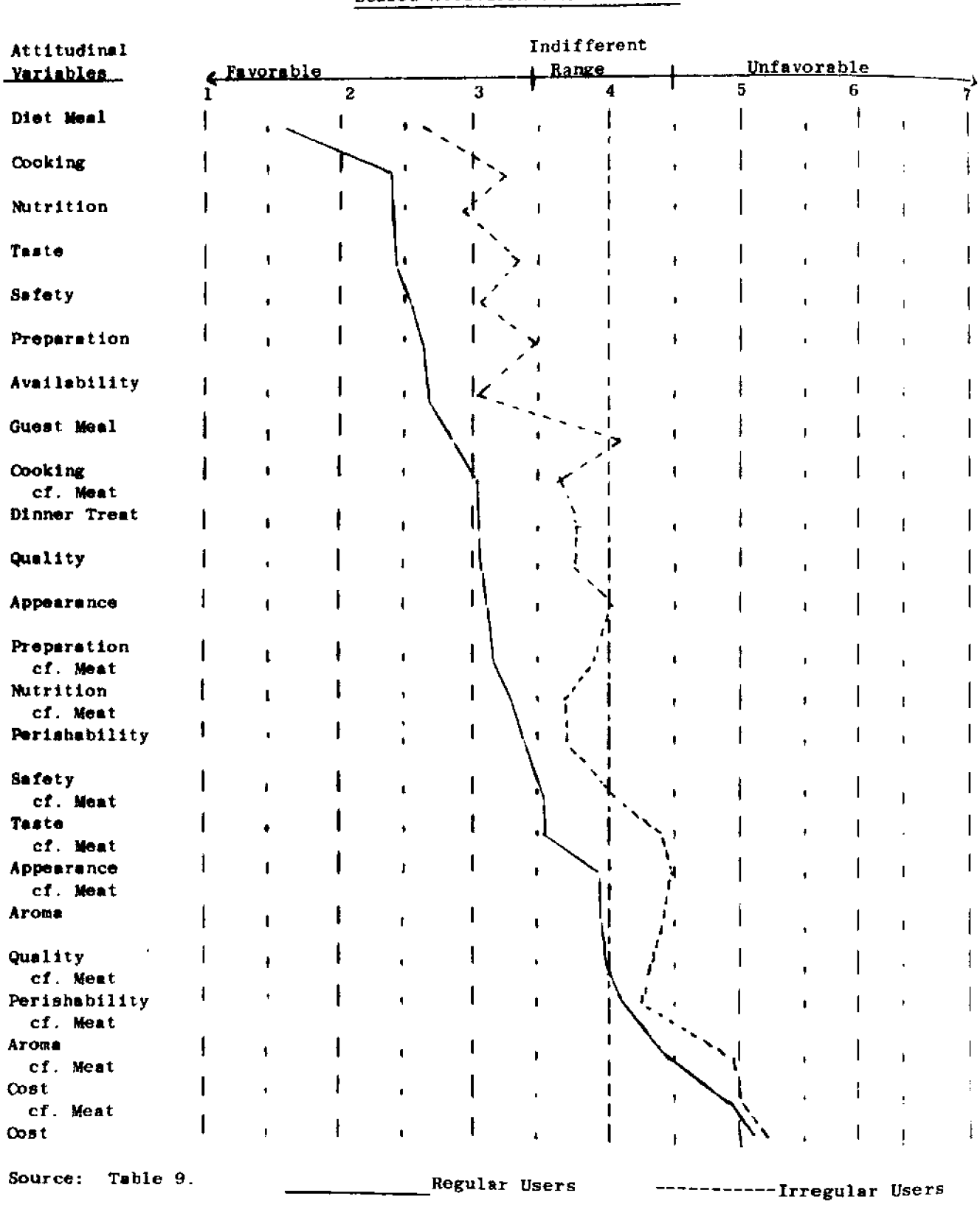
Attitudinal variables with ratings in the very favorable to definitely favorable range (1.5 to 3.5) by both groups are:

Diet meal	Taste
Cooking	Safety
Nutrition	Preparation
	Availability

The attitudinal variables rated favorably (2.5 to 3.5) by the regular user group and in the upper half of the indifferent range (3.5 to 4) by the irregular user group are:

Guest meal	Perishability
Dinner treat	Cooking compared to meat
Quality	Preparation compared to meat
Appearance	Nutrition compared to meat

FIGURE 5: ATTITUDINAL PROFILES OF REGULAR AND IRREGULAR USER GROUPS OF FROZEN UNPREPARED SHELLFISH



Source: Table 9.

Five attitudinal variables are placed in the somewhat favorable upper end of the indifferent range (3.5 to 4) by the regular user group, and in the somewhat unfavorable lower end of the indifferent range (4 to 4.5) by the irregular user group. The five variables include:

Aroma	Appearance compared to meat
Safety compared to meat	Quality compared to meat
Taste compared to meat	

The four attitudinal variables rated by both groups in the somewhat unfavorable lower end of the indifferent range to the definitely unfavorable classification (4 to 5.25) include:

Perishability compared to meat	Cost compared to meat
Aroma compared to meat	Cost

Profile Inferences for Frozen Unprepared Shellfish. First, irregular users are less enthusiastic and more inclined to be neutral in their overall attitude toward frozen unprepared shellfish than are regular users.

Second, both groups agree, as evinced by their high positive ratings, that frozen unprepared shellfish is not only easy to prepare and to cook, but tastes good. They further concur that frozen unprepared shellfish is quite nutritious, a desirable diet meal, and perfectly safe to eat. Unlike fresh shellfish, both groups think frozen unprepared shellfish is readily available in the market. In essence, both groups consider frozen unprepared shellfish easy to find, easy to use, pleasant to eat, and healthful.

Third, the regular user group also thinks frozen unprepared shellfish is a dinner treat as well as a very adequate guest meal. Other characteristics rated quite favorably are its quality, appearance, and ability not to deteriorate or spoil rapidly. On a comparative basis, it rates quite favorably to meat in terms of facility in preparing, convenience in cooking, and nutrition. The irregular user group appears to be indifferent although somewhat favorably disposed toward these variables, since their evaluations are in the upper half of the indifferent range (3.5 to 4).

Fourth, of the five variables with evaluations in the upper half of the indifferent attitudinal scale (3.5 to 4) by regular users and the lower half of the indifferent attitudinal scale (4 to 4.5) by irregular users, four are comparisons to meat. The fifth is a product characteristic - aroma. Regular users put frozen unprepared shellfish on the upper half of the indifferent range on the factors of safety, taste, appearance, and quality compared to meat, while irregular users place frozen unprepared shellfish in the lower half of the indifferent range on these factors. Generally speaking, regular users view frozen unprepared shellfish somewhat favorably on these factors and irregular users a trifle unfavorably. The impact of these factors on the sale of frozen unprepared shellfish, however, would appear to be negligible.

Fifth, the factors most likely to deter the sale of

frozen unprepared shellfish are cost, cost compared to meat, aroma compared to meat, and perishability compared to meat. Both user groups view these factors as slight to quite unfavorable characteristics, especially cost.

Frozen Prepared Shellfish. The attitudinal mean values for each of the variables of the regular and irregular user groups of frozen prepared shellfish in Table 9 are plotted in attitudinal scale form in Figure 6. From the two profiles in Figure 6, the following patterns are perceived:

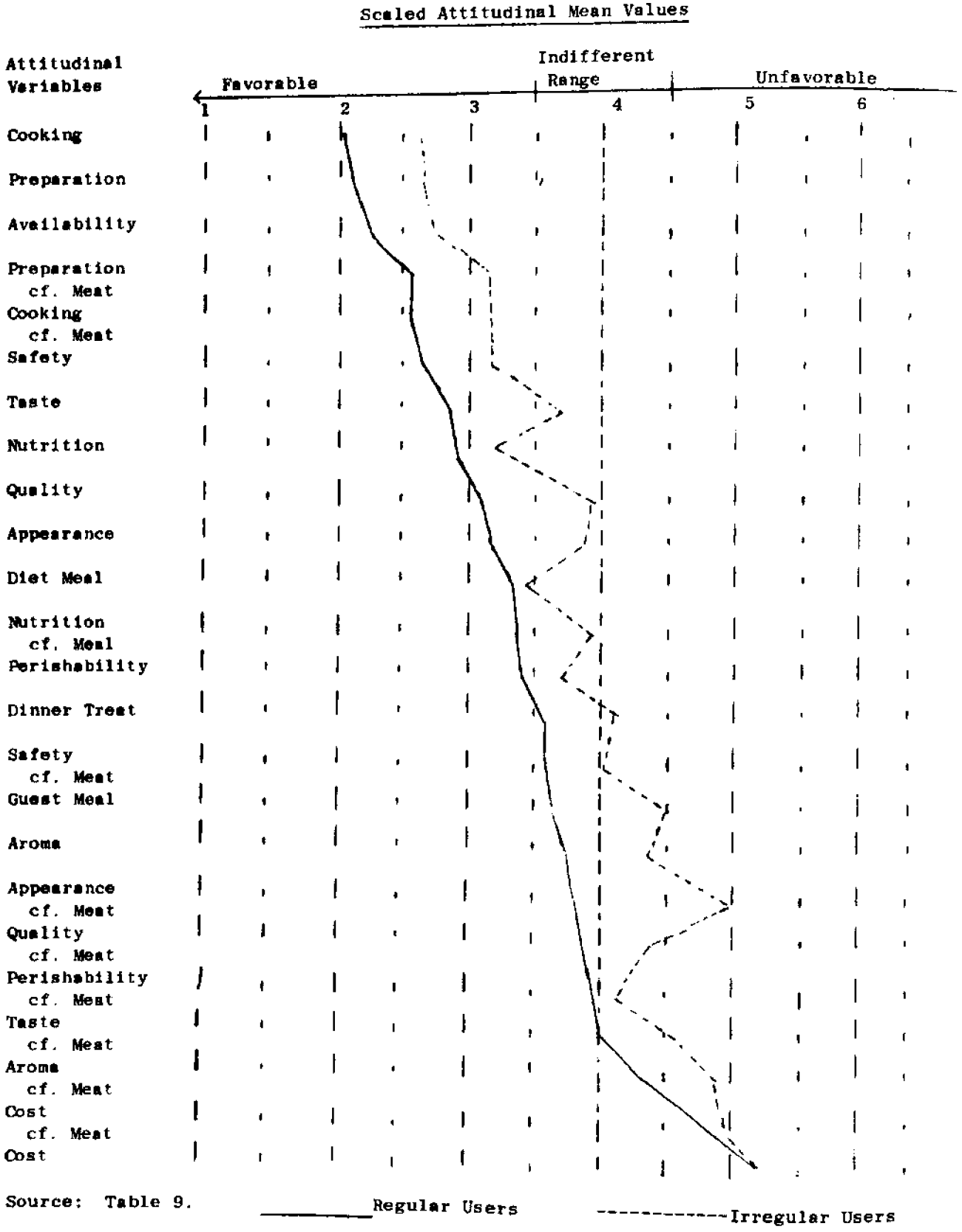
1. The regular user group rates frozen prepared shellfish more favorably than the irregular user group on all variables but cost. Both groups rate cost with equal disfavor.

2. Twenty-one of the 24 attitudinal variables are to the left of the indifferent midpoint value (4) for the regular user group, which means they are on the favorable side of the scales 88 per cent of the time. For the irregular user group, 13 of the factors are on the favorable side of the scales when viewed dichotomously. This means that the irregular user group rates the characteristics of frozen prepared shellfish favorably only 54 per cent of the time. These data unmistakenly indicate how much more favorably regular users rate frozen prepared shellfish.

3. Within the indifferent range encompassing the slightly favorable to slightly unfavorable scores (3.5 to 4.5), the regular user group has nine of the 24 variables (38 per cent) compared with 11 variables (46 per cent) for the irregular users. This further supports the observation that the latter group views frozen prepared shellfish less enthusiastically than the regular user group.

The univariate comparisons (F-ratios) reveal that both groups rate frozen prepared finfish nearly equally on the variables cost, cost compared to meat, and diet meal. They concur that it rates favorably as a diet meal but quite

FIGURE 6: ATTITUDINAL PROFILES OF REGULAR AND IRREGULAR USER GROUPS OF FROZEN PREPARED SHELLFISH



Source: Table 9.

unfavorably as to cost and cost compared to meat. On the other 21 variables, the values of the F-ratios show that the differences in the scores of the two groups are significantly different.

On an item by item basis, the regular user group and the irregular user group rate frozen prepared shellfish quite to definitely favorable (2 to 3.5) on eight attitudinal variables:

Cooking	Availability
Cooking compared to meat	Safety
Preparation	Nutrition
Preparation compared to meat	Diet meal

Five attitudinal variables are viewed quite positively (2.5 to 3.5) by the regular user group and less so by the irregular user group which places them in the upper half of the indifferent range (3.5 to 4). The variables are:

Taste	Perishability
Quality	Nutrition compared to meat
Appearance	

Sliding down the attitudinal scale further, the regular user group rates six variables slightly favorable in the upper half of the indifferent range (3.5 to 4), although the irregular user group rates these factors slightly unfavorable in the lower half of the indifferent range (4 to 4.5). The variables include:

Dinner treat	Safety compared to meat
Guest meal	Quality compared to meat
Aroma	Perishability compared to meat

The attitudinal variables in the indifferent range (3.5 to 4.5) according to regular users, but definitely unfavorable according to irregular users, are:

Appearance compared to meat
Taste compared to meat
Aroma compared to meat

The last two variables which both groups rate with equal disfavor are:

Cost
Cost compared to meat

Profile Inferences for Frozen Prepared Shellfish. From these data the following observations may be deduced.

First, the regular user group rates frozen prepared shellfish more favorably on all attitudinal variables except cost, which both groups rank with equal disfavor. While the regular user group is generally favorably inclined toward frozen prepared shellfish, the irregular user group tends to be impartial or indifferent in its attitude.

Second, both groups believe frozen prepared shellfish is readily available in the market place and convenient to prepare and cook by itself as well as in comparison to meat. They feel it is not a hazardous product to eat; it is high in nutrition; and it is a good diet meal.

Third, regular users rate frozen prepared shellfish quite favorably on taste, quality, appearance, perishability, and nutrition compared to meat. Irregular users, however, put frozen prepared shellfish in the upper half on the indifferent range (3.5 to 4) or rate it only somewhat favorably on these characteristics. Hence, irregular users are likely to be more impartial about the taste, appearance, quality, perishability,

and nutrition of frozen prepared shellfish compared to meat than are regular users.

Fourth, both groups put frozen prepared shellfish in the indifferent range on the characteristics of dinner treat, guest meal, and aroma, as well as safety, quality, and perishability compared to meat. The regular user group, however, rates these characteristics in the upper half of the indifferent range (3.5 to 4), whereas the irregular user group rates them in the lower half (4 to 4.5). Neither group thinks frozen prepared shellfish is a very desirable dinner treat or guest meal, nor do they think the fragrance of frozen prepared shellfish is a characteristic which motivates their purchase of the product. Lastly, they believe frozen prepared shellfish is about on par with meat as to quality, perishability, and safety in eating.

Fifth, additional comparisons to meat show that the irregular user group believes frozen prepared shellfish rates unfavorably in appearance, taste, and aroma. These people, consequently, would be more inclined to buy meat for its taste, appearance, and aroma than frozen prepared shellfish. The regular user group rates frozen prepared shellfish in the lower half of the indifferent range (4 to 4.5), somewhat unfavorably, on these factors. They too, do not consider frozen prepared shellfish superior to meat in taste, appearance or aroma, although the regular user groups is less critical than the irregular consumer group.

Six, there is no difference in the ratings of either group on cost and cost compared to meat. Both groups consider its cost quite unfavorable and a major deterrent to its usage.

Summary of Attitudinal Profiles of Regular and Irregular Shellfish User Groups

A comparison of the attitudinal profiles of the regular and irregular user groups for each type of shellfish leads to the following conclusions:

1. The fresh shellfish regular user group not only rates fresh shellfish better on desirable characteristics, but also worse than the irregular users on undesirable characteristics. This is not true for the ratings of frozen unprepared and prepared shellfish. Regular user groups rate these latter products more favorably than the irregular user groups on all but a couple of characteristics, which are rated equally by both groups.

2. Univariate comparisons of the group means for each variable between regular and irregular users show significant differences in mean ratings for 63 of the 72 comparisons. Interestingly, the nine comparisons in which the regular and irregular user groups rate variables equally or nearly equally are distributed evenly among the three types of shellfish, with 21 attitudinal variables significantly different and three not significantly different for each type of shellfish. As was true for finfish, the significant differences are esentially a matter of degree between regular and irregular user groups

rather than sharply contrasting attitudes toward a variable. Hence, the attitudes of regular and irregular user groups are similar for a given type of shellfish, although those of the regular user groups are stronger than those of the irregular user groups.

3. Among the three types of shellfish, the attitudes for fresh shellfish are more intense than those for frozen unprepared shellfish which, in turn, are stronger than those for frozen prepared shellfish. This produces profiles for frozen prepared shellfish that fall more in the middle range than those for fresh or frozen unprepared shellfish. The respondents, accordingly, are more likely to be indifferent to frozen prepared shellfish than the other types of shellfish.

4. All of the regular and irregular user groups consider all three types of shellfish quite safe to eat. The pollution alerts have not had a detrimental effect on the sale of shellfish. In comparison to meat, each of the regular user groups rates shellfish somewhat favorably as to safety, while the irregular user groups tend to be at the midpoint in the indifferent range. Since neither the regular nor irregular user groups rate shellfish unfavorably, they do not think shellfish is any more hazardous to eat than meat.

5. All of the regular user groups of fresh, frozen unprepared, and frozen prepared shellfish consider the taste of each respective type of shellfish quite good. The

irregular user groups also rate the taste of shellfish as good, but they are not as enthusiastic about its taste as the regular user groups. When asked to compare the taste of shellfish to meat, regular users rate it quite favorably. Regular users of frozen unprepared and frozen prepared shellfish are essentially indifferent, although inclined to rate the taste of frozen shellfish slightly favorably if pressed. The irregular user groups of fresh and frozen unprepared shellfish are in the indifferent range, being somewhat favorably disposed toward fresh shellfish and unfavorably disposed toward frozen unprepared shellfish. Irregular users of frozen prepared shellfish are more firm in their attitude that frozen prepared shellfish does not compare to meat favorably. To increase the sales of frozen unprepared and prepared shellfish to irregular users, their proclivity to rate the taste of frozen shellfish second to that of meat must be changed if it reflects their disinclination to buy the product.

6. The regular and irregular user groups concur that shellfish is convenient to use. Considering the amount of preparation and cooking effort required, frozen prepared shellfish is rated most favorably, followed by frozen unprepared shellfish and fresh shellfish. The comparisons to meat produce similar results. That is, frozen prepared shellfish is rated most favorably in terms of ease of preparation and cooking, with frozen unprepared shellfish ranking second and

fresh shellfish third. All of the regular user groups and the irregular frozen prepared shellfish user group rate shellfish quite favorably on these characteristics in comparison to meat. The irregular user groups of frozen unprepared and fresh shellfish, however, fall in the upper half of the indifferent range (3.5 to 4). Since shellfish is not considered an inconvenient product to prepare and cook, perhaps this aspect should be promoted more.

7. All of the regular and irregular user groups rate shellfish very favorably to quite favorably in nutrition. An intriguing dimension of the ratings is the fact that fresh shellfish is rated the highest, frozen unprepared shell fish second highest, and frozen prepared shellfish third highest in nutrition. Is there truly a difference in the nutritional value of each type of shellfish? If not, this attitude should be dispelled.

The nutrition of shellfish compared to meat is also in the quite favorable to definitely favorable range (2.7 to 3.2 for the regular user groups. The irregular user groups tend to rate shellfish in the upper-half of the indifferent range. Once again, in comparison to meat, the same ranking of frozen prepared shellfish as the least nutritious, frozen unprepared shellfish as more nutritious, and fresh shellfish as the most nutritious is clearly seen.

8. Each of the regular and irregular user groups

believes shellfish is a desirable diet dinner. Fresh and frozen unprepared shellfish, however, are considered substantially better diet dinners than frozen prepared shellfish. Regular users also consider shellfish a dinner treat and a guest meal, especially fresh shellfish. Although irregular users agree somewhat with the regular users that fresh shellfish is a dinner treat or appropriate guest meal, they are indifferent to frozen unprepared shellfish, and opposed to frozen prepared shellfish as a dinner treat or guest meal. Two questions that should be investigated further are: (1) Why is shellfish scored higher as a dinner treat than a guest meal?; and (2) Why are fresh and frozen unprepared shellfish rated better than frozen prepared shellfish as a dinner treat, guest meal, or diet dinner?

9. The regular user groups judge the quality of all three types of shellfish to be nearly equal in the quite favorable (3.06 to 3.13) range of the attitudinal scales. The irregular user groups' estimates of quality are in the upper half of the indifferent range at 3.6 to 3.9. Nonetheless, in comparison to meat, the regular user groups place shellfish in the upper half of the indifferent range (3.8 to 3.9), while irregular users place it in the lower half (4.2 to 4.4). On the basis of these attitudinal mean scores, there seems to be some doubt about the reliability of the quality of shellfish in comparison to meat. Spokesmen

who call for compulsory inspection and grading of all domestic and foreign fish sold in the United States in hopes of achieving uniform quality for designated grades of fish evidently sense this problem.

10. The appearance of shellfish is considered quite appetizing (2.6 to 3.1) by all of the regular user groups. Irregular users of frozen unprepared shellfish are positioned at the midpoint of the indifferent range (4), whereas irregular users of fresh and frozen prepared shellfish rate these products somewhat favorably in appearance at 3.75 and 3.78, respectively. The color and eye-appeal of shellfish obviously are not obstacles to its sale or consumption. Meat, however, is definitely more appetizing than shellfish in appearance to the irregular users. Conversely, regular users consider shellfish a trifle more appetizing in appearance than meat. More attractive packaging might aid in changing the attitude of irregular users.

11. The odor of shellfish is scored somewhat favorably in the upper-half of the indifference range (3.5 to 3.9) by regular user groups, and in the slightly unfavorable lower-half of the indifference range (4.38 to 4.40) by irregular user groups. The irregular user groups rate shellfish quite unfavorably on aroma in comparison to meat. Regular user groups tend to agree with the irregular users that the aroma of shellfish in comparison to meat is less appealing.

12. Both the regular and irregular user groups of fresh shellfish rate it very unfavorably on perishability. Both groups also concur that fresh shellfish spoils much faster than meat. The regular users of frozen unprepared and frozen prepared shellfish rate both forms of frozen shellfish quite favorably on resistance to perishability. The irregular users agree that frozen shellfish keeps a long time, but their scores on this characteristic are somewhat less than those of the regular frozen shellfish users. In comparison to meat, however, there are several inconsistencies in attitudes. Regular users of frozen unprepared shellfish, for instance, think it compares somewhat unfavorably in perishability to meat, whereas regular users of frozen prepared shellfish think it keeps a trifle better than meat. Similarly, both groups of irregular users believe meat keeps somewhat longer than frozen unprepared or frozen prepared shellfish. Actual tests of the perishability of fresh shellfish versus meat and frozen shellfish versus frozen meat should be conducted and favorable results published.

13. The inability to purchase fresh shellfish readily in food stores is a major unfavorable feature reported by regular and irregular users. In contrast, both types of frozen shellfish are easy to find according to the very high ratings of the regular and irregular user groups. Between the two types of frozen shellfish, however, frozen

prepared shellfish evidently is more readily available than frozen unprepared shellfish. In support of those who put forth the view that sales are a function of the supply available, efforts should be made to persuade more food stores to handle fresh shellfish.

14. Cost and cost compared to meat are unequivocally the two worst characteristics of shellfish. All groups of regular and irregular users evaluate fresh, frozen unprepared, and frozen prepared shellfish critically with respect to cost (price) and cost (price) compared to meat. If the price of shellfish were to rise faster than the price of meat, even regular users might substitute more meat for shellfish or curtail their purchase of both products.

Univariate Comparisons of Group Demographic Means for Regular and Irregular User Groups of Fresh, Frozen Unprepared, and Frozen Prepared Shellfish

Group Demographic Means and Univariate Comparisons.

The group means of the regular and irregular users of fresh, frozen unprepared, and frozen prepared shellfish for each of the 12 demographic variables appear in Table 10. The F-ratios resulting from the univariate comparisons of the means for regular and irregular users of each type of shellfish are also given in Table 10. It should be noted from the codes in Table 10 that larger mean scores are indicative of higher mean values for the respective demographic variables. This is opposite to the mean values of

TABLE 10
UNIVARIATE COMPARISONS OF GROUP DEMOGRAPHIC MEANS FOR REGULAR AND IRREGULAR USERS OF FRESH, FROZEN UNPREPARED, AND FROZEN PREPARED SHELLFISH

	Fresh			Frozen Unprepared			Frozen Prepared		
	Regular Users $\bar{M}$	Irregular Users $\bar{M}$	F Ratio	Regular Users $\bar{M}$	Irregular Users $\bar{M}$	F Ratio	Regular Users $\bar{M}$	Irregular Users $\bar{M}$	F Ratio
Age of housewife[a]	3.62	3.31	12.82	3.47	3.35	0.40*	3.32	3.37	0.30*
Age of head of household[a]	3.79	3.63	3.51*	3.73	3.64	0.27*	3.53	3.68	2.62*
Number of children at home[b]	2.27	2.26	0.10*	2.31	2.25	0.10*	2.26	2.25	0.00*
Age category of children[c]	2.54	2.33	7.95	2.51	2.35	0.75*	2.42	2.36	0.80*
Size of household[d]	2.44	2.43	0.01*	2.45	2.44	0.01*	2.53	2.42	3.28*
Education of head of household[e]	3.56	3.38	5.59	3.77	3.36	12.83	3.46	3.41	0.67*
Income[f]	5.20	4.70	15.38	5.24	4.72	0.10*	4.91	4.77	1.46*
Protestant or not[g]	0.52	0.56	1.42*	0.53	0.56	2.13*	0.54	0.56	0.62*
Catholic or not[g]	0.40	0.37	0.86*	0.38	0.37	1.71*	0.42	0.36	1.70*
Jewish or not[g]	0.03	0.04	0.11*	0.04	0.06	1.21*	0.03	0.04	1.66*
White or not[g]	0.86	0.89	1.86*	0.88	0.89	0.06*	0.87	0.89	0.42*
Black or not[g]	0.13	0.10	1.66*	0.12	0.10	0.73*	0.11	0.10	0.12*

[a]Adult's Age Categories
(1) under 26
(2) 26 to 35
(3) 36 to 45
(4) 46 to 55
(5) 56 to 65
(6) Over 65

[b]Actual Number

[c]Children's Age Categories
(1) Pre-school (age 1-5)
(2) Elementary (age 6-12)
(3) Teen (age 13-19)

[d]Household Size Categories
(1) One person
(2) 2 to 3 persons
(3) 4 to 5 persons
(4) 6 to 7 persons
(5) 8 to 9 persons
(6) 10 persons

[e]Education Categories
(1) Elementary
(2) Some high school
(3) High school
(4) Some college
(5) College

[f]Income Categories
(1) Under $4,000
(2) $4,000 - 5,999
(3) $6,000 - 7,999
(4) $8,000 - 9,999
(5) $10,000 -11,999
(6) $12,000 -13,999
(7) Over $14,000

[g]Dummy variable code: 1 or 0

*Variables non-significant at .05 level

Source: Survey data

attitudes discussed in the previous section where lower scores are indicative of greater favorability and high scores denote disfavor. Demographic variables for race and religion are treated dichotomously (1 or 0) since they are qualitative instead of quantitative in nature as described earlier.

Fresh Shellfish. The data in Table 10 show that four of the 12 demographic variables have significant F-ratios in the univariate comparison of group demographic means for regular and irregular users of fresh shellfish. These variables are:

Age of housewife
Age category of children
Education of head of household
Income

These variables suggest first, that housewives in the regular user group are older than those in the irregular user group. Second, children of families in the regular user group are older than those in the irregular user group. Third heads of households in the regular user group have more education than those in the irregular user group. Finally, total household income in the regular user group is higher than in the irregular user group.

The demographic variables dealing with religion and race show no statistically significant differences in the univariate comparisons of group mean values for fresh shellfish. However, the group mean values for these variables

suggest that the regular user group includes more Catholics, fewer Protestants, fewer Jews, fewer whites, and more blacks than the irregular user group.

Frozen Unprepared Shellfish. Education of head of household is the only variable significant in the univariate comparisons of group demographic means for frozen unprepared shellfish. The direction of effect of this variable indicates that heads of households in the regular user group have more education than heads of households in the irregular user group.

Although the other demographic variables in the univariate comparisons of demographic group mean values for frozen unprepared shellfish are not satistically signficant, the group mean values are indicative of the demographic profiles of the groups. First, housewives and heads of households in the regular user group are somewhat older than those in the irregular user group. Second, families in the regular user group have more, as well as older children than families who are irregular users. Third, families in the regular user group have higher incomes than families in the irregular user group. Finally, the regular user group includes more Catholics, fewer Protestants, fewer Jews, fewer whites, and more blacks than the irregular user group.

Frozen Prepared Shellfish. In keeping with the data in Table 10, there are no significant differences in the group demographic means of regular and irregular users of frozen

prepared shellfish at the .05 level. From the group mean values, however, demographic profiles are evident, even thougl they are somewhat less definite. The housewives and heads of households in the regular user group are younger than those in the irregular user group of frozen prepared shell-fish, and their children are older than children in the irregular user group. Regular users of frozen prepared shell fish also have slightly larger households and higher incomes than irregular users. Finally, regular users of frozen prepared shellfish tend to include more Catholics, fewer Protestants, fewer Jews, fewer whites, and more blacks than irregular users.

Summary of Comparisons of Group Demographic Means

Admittedly, the inferences which may be drawn from the demographic profiles are tenuous because there are few statistically significant differences in the mean scores between the regular and irregular user groups of each type of shellfish. Examination of the mean scores, nonetheless, does reveal tendencies among the regular and irregular user groups.

Age. Regular users of fresh and frozen unprepared shel fish are slightly older in terms of age of housewife and age of head of household (36 to 45 year range) in comparison to the irregular user groups. For frozen prepared shellfish, however, the pattern is reversed, with younger housewives

and heads of households in the regular user group and older ones in the irregular user category. It will be recalled that the same paradigm was found for finfish users; that is, the younger housewives and heads of households are more likely to be regular users of prepared fish. It may be concluded, then, that the consumption of prepared shellfish is more likely to increase faster than other types of shellfish because of the high proportion of younger people in our society.

Children. The number of children living at home is practically identical for all groups of regular and irregular users of shellfish. The ages of the children, however, do differ. First, all three irregular user groups have younger children than the regular user groups. Among the regular user groups, the regular consumers of frozen prepared shellfish have the youngest age children - a factor consistent with the younger age of housewives and heads of households in this category.

Size of household. At the .10 level of significance, the average size of household tends to be larger in the regular user as opposed to the irregular user group.

Education of head of household. Overall, the education of the head of household is less for each of the three irregular user groups than the regular user groups. The educational level is also significantly higher for the regular users of fresh and frozen unprepared shellfish in comparison to

the irregular users. The educational level between both groups of frozen prepared shellfish is identical. Regular frozen prepared shellfish users, however, have the lowest mean educational figure among the regular user groups and the highest mean figure among the irregular user groups. Clearly, there is a direct relationship between the level of education of the head of household and regular consumption patterns of fresh and frozen unprepared shellfish.

Income. The annual income of regular users is larger than the income of irregular users for all three types of shellfish. Similar to the educational pattern, regular prepared shellfish users have a lower average income than regular users of fresh or frozen unprepared shellfish, and a higher average income than the irregular users of fresh and frozen unprepared shellfish.

Religion. There are no significant differences in the F-ratios between regular and irregular user groups of fresh, frozen unprepared, or prepared shellfish. The mean values, however, suggest that more Catholics, fewer Protestants, and fewer Jews are in the regular user groups than in the irregular user categories. Catholics who are regular consumers of shellfish seem to prefer frozen prepared, fresh, and frozen unprepared shellfish, in that order. Protestants seem to prefer frozen prepared somewhat more than frozen unprepared shellfish, and fresh shellfish the least. Jews appear to have no preference between fresh or frozen prepared shellfish and

and a lesser preference for frozen unprepared shellfish.

Race. The mean values for race suggest that there are more blacks and fewer whites proportionally among the regular user groups of fresh, frozen unprepared, and frozen prepared shellfish than among the irregular user groups. Regular users among blacks prefer fresh shellfish somewhat more than frozen unprepared shellfish, and frozen prepared shellfish the least. Whites prefer frozen unprepared, frozen prepared, and fresh shellfish, in that sequence.

Attitudinal and Demographic Profiles of Regular and Irregular User Groups of Canned Fish

Univariate Comparisons of Attitudinal Variables. The mean values for each of the attitudinal variable of the regular and irregular user groups of canned fish are listed in Table 11. The F-ratios resulting from the univariate comparisons of the respective attitudinal mean values of regular versus irregular user groups are also shown in Table 11. In Figure 7, the mean attitudinal scores are given in scaled semantic differential form to facilitate comparisons between the regular and irregular user groups. The profiles of the regular and irregular user groups in Figure 7 bring forth the following observations:

1. The regular canned fish user group rates the product more favorably on all attitudinal variables than the irregular user group.

2. For regular canned fish users, 15 of the 24 attitudinal variables (62.5 per cent) are in the very favorable to definitely favorable range (1.3 to 3.5).

TABLE 11
UNIVARIATE COMPARISONS OF GROUP
ATTITUDINAL MEANS FOR REGULAR
AND IRREGULAR USERS OF
CANNED FISH

	Canned Fish		
Attitudinal Variable	Regular Users $\bar{M}$	Irregular Users $\bar{M}$	F Ratio
Taste	2.72	4.30	350.22
Taste cf. meats	4.22	4.93	78.15
Nutrition	2.80	3.33	94.17
Nutrition cf. meats	3.96	4.10	34.63
Cost	2.98	3.05	3.10*
Cost cf. meats	2.21	2.45	14.23
Aroma	3.98	4.87	80.92
Aroma cf. meats	4.82	5.15	39.71
Perishability	3.20	3.85	70.88
Perishability cf. meats	3.33	3.98	61.44
Preparation	2.40	3.70	112.23
Preparation cf. meats	2.61	3.74	58.74
Cooking	2.15	3.41	69.01
Cooking cf. meats	2.40	3.68	64.86
Appearance	3.38	4.31	115.33
Appearance cf. meats	4.18	4.52	44.35
Quality	3.20	4.24	154.30
Quality cf. meats	4.10	4.87	81.82
Availability	1.31	1.54	36.05
Dinner treat	4.70	4.81	5.55
Guest meal	4.81	5.37	50.62
Diet meal	2.19	2.96	25.76
Safety	2.96	3.98	87.98
Safety cf. meats	3.86	4.39	58.64

*Variable non-significant at .05 level.

Source: Survey data

Irregular users put only six of the variables (25 per cent) in this range.

3. Six of the attitudinal values (25 per cent) of regular users fall within the indifferent range (3.5 to 4.5) in Figure 7. Eleven attitudinal variables (46 per cent) for the irregular user group, however, are in the indifferent range. Further, irregular users rate seven additional characteristics (29 per cent) as definitely unfavorable, while regular users rate three of the factors this way.

Review of the F-ratios in Table 11 reveals that the mean values for 23 of the 24 attitudinal variables are significantly different for regular and irregular canned fish users. Both groups rate the cost of canned fish so closely at 2.98 and 3.05 on the favorable segment of the semantic scale that there is no significant difference between them concerning this attribute.

Attitudinal variables with mean values in the very favorable to definitely favorable range (1.3 to 3.5) for both the regular and irregular user groups include:

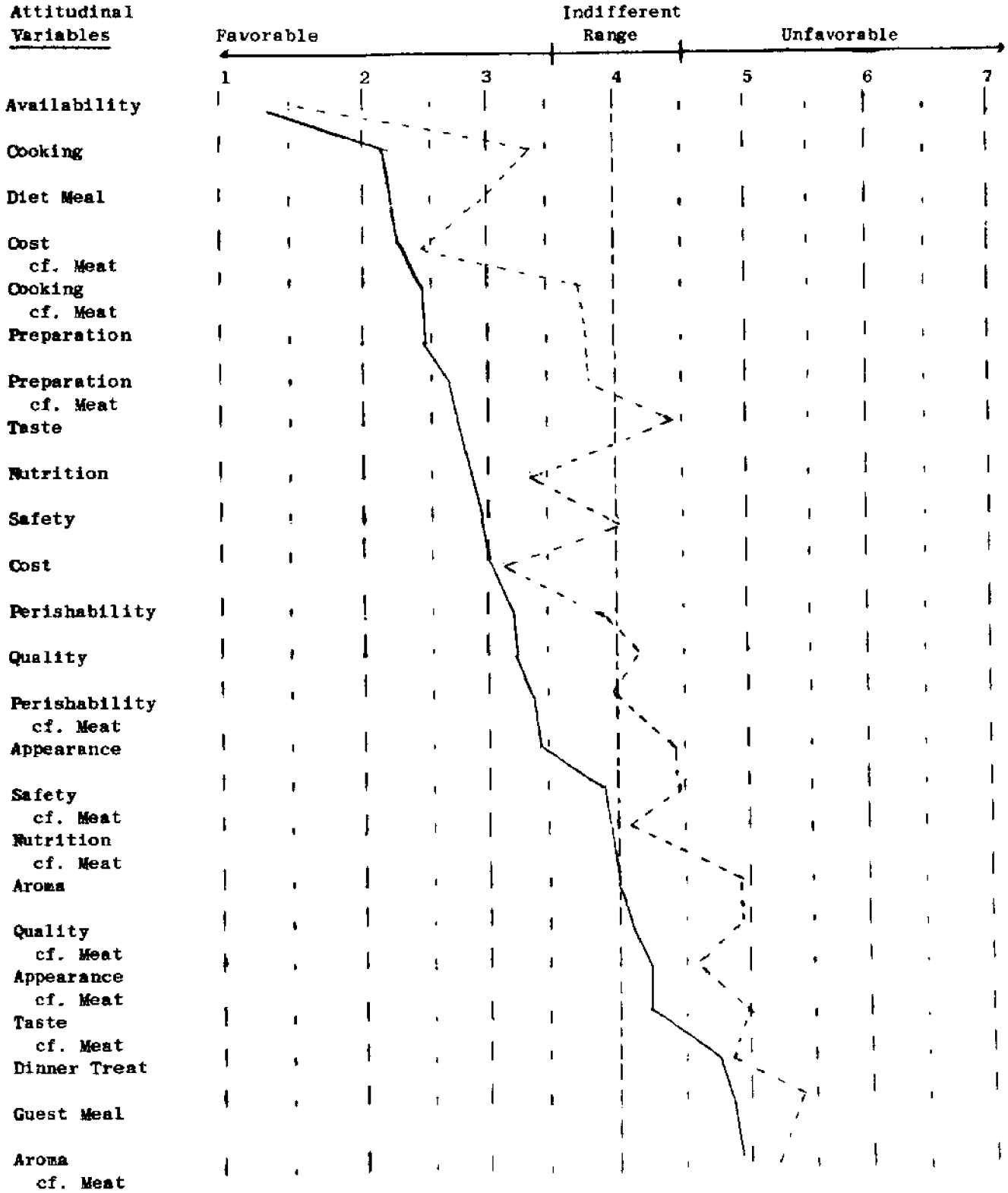
Availability	Nutrition
Cooking	Cost
Diet meal	Cost compared to meat

The characteristics considered definitely favorable (2.4 to 3.5) by regular users, but rated as perhaps only slightly favorable in the upper-half of the indifferent range (3.5 to 4) according to irregular users, are:

Preparation	Safety
Preparation compared to meat	Perishability
Cooking compared to meat	Perishability compared to meat

Three attitudinal variables with high favorable ratings

FIGURE 7: ATTITUDINAL PROFILES OF REGULAR AND IRREGULAR USER GROUPS OF CANNED FISH



Source: Table 11.

(2.5 - 3.5) among regular users, and slightly unfavorable ratings in the lower-half of the indifferent range (4 to 4.5) among irregular users, are:

Taste
Quality
Appearance

Two attitudinal variables are placed in the upper-half of the indifferent range (3.5 to 4) by regular users, while irregular canned fish users put them in the lower-half of the indifferent range (4 to 4.5). These are:

Safety compared to meat
Nutrition compared to meat

Four characteristics are given somewhat unfavorable ratings in the lower-half of the indifferent range (4 to 4.5) by the regular user group, in contrast to the irregular user group that rates these characteristics quite unfavorable. These are:

Aroma
Quality compared to meat
Appearance compared to meat
Taste compared to meat

The three variables identified by both groups as definitely unfavorable attributes are:

Dinner treat
Guest meal
Aroma compared to meat

Summary of Attitudinal Profiles of Regular and Irregular User Groups of Canned Fish

Inferences from the attitudinal data in Table 11 and Figure 7 concerning the profiles of regular and irregular user groups of canned fish are summarized below:

1. Regular users rate canned fish better on all attributes than do irregular users. As a result, the profile of regular users is skewed in the favorable direction, while the profile of irregular users is best described as essentially indifferent.

2. Univariate comparisons of the means produce significant differences between regular and irregular users on 23 of the 24 attitudinal variables. These are primarily differences in degree of favor or disfavor, although some opposite ratings are readily apparent in Figure 7.

3. Canned fish does not fare as well as finfish or shellfish in terms of safety. Regular users believe canned fish is safe to eat, while irregular users appear to be uncertain if canned fish is safe or unsafe. In comparison to meat, regular users rate canned fish a trifle more safe to eat than most meats. Irregular users, on the other hand, are inclined to rate canned fish somewhat less safe to eat than most meats. Conditions of contamination and pollution have unquestionably influenced these ratings. It is incumbent on domestic packers to assure the public that their products are rigorously inspected and controlled if they hope to attain greater sales in the future.

4. Regular users think the taste of canned fish is quite good, whereas irregular users rate taste as slightly unfavorable in the lower-half of the indifferent range.

Irregular users also consider canned fish much less tasty than most meat. The regular users tend to agree with the irregular users, although they are less critical of the taste of canned fish in comparison to meat. Meat clearly has an edge over canned fish in taste and is likely to be considered as a menu item more readily than canned fish. Under these circumstances, perhaps other characteristics of canned fish should be featured in promotional material to enhance sales.

5. The attitudinal profiles show regular users rate canned fish very high on ease of preparation and cooking, even in comparison to meat. Irregular users concur with regular users, but they appear to do so reluctantly since their ratings fall in the slightly favorable upper-half of the indifferent range, except for ease of cooking. These data further reflect the pattern evident in findings above that irregular users prefer meat to canned fish and are rating canned fish accordingly.

6. Both groups consider canned fish quite nutritious. Neither group, however, considers canned fish significantly more nutritious than most meat. As a matter of fact, irregular users rate canned fish slightly unfavorably in nutrition compared to most meat.

7. As a meal, the regular and irregular user groups concur that canned fish is a very favorable diet meal. Further, both groups strongly agree that canned fish is neither a dinner treat nor a guest meal.

8. Reliability of quality is rated favorably by the regular users and somewhat unfavorably, in the lower-half of the indifferent range, by the irregular users. Reliability of quality in comparison to meat is also rated slightly unfavorably in the indifferent range by regular users, and definitely unfavorably by irregular users. Like safety, evidence supporting the reliability of the quality of canned fish, especially in comparison to meat, must be provided by the packers.

9. Attitudes concerning the appearance of canned fish are the same as those towards reliability of the quality of canned fish. That is, regular users rate appearance quite favorably while irregular users consider appearance somewhat unfavorably on the lower half of the indifferent range. Appearance in comparison to meat is regarded slightly unfavorably in the indifferent range by regular users, and definitely unfavorably by irregular users. Why the appearance of canned salmon, tuna, or pickled herring is considered unattractive by irregular users and less attractiv than beef liver, hamburg, or pork chops by both groups is an issue not undertaken in this study.

10. Attitudes regarding the aroma of canned fish are also perplexing. At best, regular users are indifferent. They think it is neither pleasant nor unpleasant. Irregular users, however, consider the aroma of canned fish quite unpleasant. In comparison to meat, both groups conclude tha

the aroma of canned fish is very unpleasant. By some tests, the canned fish used in salads, sandwiches, or hors d'oeuvres usually emits little odor unless it is cooked. The unfavorable image of canned fish as an offensive, odorous menu item prevails nonetheless.

11. Regular users rate canned fish quite favorably on perishability and on perishability compared to meat. The irregular users do not think canned fish keeps too well since they rate it slightly favorably on the upper-half of the indifferent range, and on par with meat as to perishability.

12. Both groups concur that canned fish is readily available in food stores. Their mean scores are at the upper end of the attitudinal rating scale on availability.

13. Cost of canned fish as well as cost compared to meat are rated quite favorably by the regular and irregular user groups. Interestingly, the cost of canned fish compared to meat is rated better than cost alone. Comparatively, canned fish is recognized as a lower cost food.

Univariate Comparisons of Group Demographic Means for Regular and Irregular Users of Canned Fish

Group Demographic Means and Univariate Comparisons. Coding of the demographic variables for canned fish is done left-to-right so that higher mean values are indicative of larger size families, greater income, or more education. Race and religion are treated in a dichotomous fashion as above.

The group mean values, as well as the univariate comparisons (F-ratios) of the group mean values of the demographic variables for canned fish, will be found in Table 12. Nine of the 12 demographic variables are significant between regular and irregular user groups of canned fish when compared on a univariate basis. The non-significant variables between the two groups include age of housewife, number of children, and age category of children.

Summary of Comparisons of Group Demographic Means for Regular and Irregular Users of Canned Fish

Interpretation of the differences in mean scores of the demographic variables between regular and irregular user groups of canned fish leads to the following observations:

Age. Among the regular users of canned fish, the age of the housewife is a trifle less than the average age of the housewife among the irregular users. The difference noted above is not statistically significant at the .05 level, however. The age of the head of the household among regular users is also less than the average age of the head of the household for irregular users. Because the difference in age of the head of the household is statistically significant, it supports the observation that regular users of canned fish are more likely to be younger families than the irregular users.

Children. The data relating to children reflect the fact that the regular users have somewhat more children, as

TABLE 12.
UNIVARIATE COMPARISONS OF GROUP DEMOGRAPHIC MEANS
FOR REGULAR AND IRREGULAR USERS OF CANNED FISH

Demographic Variable	Canned Fish		
	Regular Users $\bar{M}$	Irregular Users $\bar{M}$	F Ratio
Age of housewife[a]	3.33	3.42	1.43*
Age of head of household[a]	3.58	3.77	8.27
Number of children at home[b]	2.32	2.14	2.93*
Age category of children[c]	2.39	2.32	1.31*
Size of household[d]	2.56	2.24	55.46
Education of head of household[e]	3.57	3.18	45.88
Income[f]	5.05	4.36	47.69
Protestant or not[g]	0.52	0.61	12.40
Catholic or not[g]	0.40	0.33	7.55
Jewish or not[g]	0.06	0.03	5.53
White or not[g]	0.91	0.84	18.91
Black or not[g]	0.08	0.14	19.77

[a]Adult's Age Categories
(1) Under 26
(2) 26 to 35
(3) 36 to 45
(4) 45 to 55
(5) 56 to 65
(6) Over 65

[b]Actual Number

Children's Age Categories
(1) Pre-school (age 1 - 5)
(2) Elementary (age 6 - 12)
(3) Teen (age 13 - 19)

[d]Household Size Categories
(1) One person
(2) 2 to 3 persons
(3) 4 to 5 persons
(4) 6 to 7 persons
(5) 8 to 9 persons
(6) 10 persons

[e]Education Categories
(1) Elementary
(2) Some high school
(3) High school
(4) Some college
(5) College

[f]Income Categories
(1) Under $4,000
(2) $4,000 - 5,999
(3) $6,000 - 7,999
(4) $8,000 - 9,999
(5) $10,000 -11,999
(6) $12,000 -13,999
(7) Over $14,000

[g]Dummy variable code: 1 or 0

*Variables non-significant at .05 level.

Source: Survey data.

well as slightly older children, than do irregular users of canned fish. Be that as it may, the differences in the mean values of these variables are not significantly differen at the .05 level.

Size of Household. The difference in size of household is significantly different between the regular and irregular users. The regular user's household is larger than that of the irregular canned fish user, and tends to reflect a greater number of children as well as fewer single, widowed, or separated families.

Education of head of household. The mean scores reflect the fact that the head of the household has some education beyond high school, on the average, for both groups. The education of the head of household among regular users, nevertheless, is significantly higher than the educational level of the irregular users.

Income. The higher level of education is reflected by the larger average annual income ($10,100) of regular users in comparison to the average annual income ($8,760) of irregular users.

At this juncture, the regular user group of canned fish may be depicted as essentially the younger, larger size household whose head has more education and a commensurate greater average annual income. Conversely, the irregular user group may be characterized as the somewhat older, smaller size household whose head has less education and a

lower annual average income than found in the regular user group.

Religion. The regular user group tends to include more Catholics and Jews but fewer Protestants than the irregular user group. On the basis of religion, Protestants are more likely to be irregular users of canned fish than Catholics or Jews. The role of fish in the dietary habits of the respondents is clearly reflected by their religious background.

Race. Classification by race reveals that the regular user group proportionally includes more whites and fewer blacks than the irregular user groups. Blacks, then, are more likely to be irregular users of canned fish, while whites are more likely to be regular users. Blacks, it will be recalled, prefer fresh fish.

Multivariate Analyses: Derivation of Linear Discriminant Functions to Distinguish Regular from Irregular Users

This study is devoted to analyses of attitudinal and demographic profiles of regular and irregular users of fresh, frozen unprepared, and frozen prepared fin and shellfish, as well as canned fish. Its specific purpose is to determine similarities and differences between the regular and irregular users of each type of fish. Thus far, the 1,730 respondents to the survey have been identified as either regular or irregular users of each type of fish; and the respective mean scores for the 24 attitudinal and 12 demographic

variables have been calculated for each group. Not only are the attitudinal and demographic profiles of regular and irregular users described in the previous section, but inferences based on these profiles are also drawn. The statistical technique of univariate analysis has been utilized to determine which variables are significantly different. In this section the data are further analyzed through application of the multivariate technique.

Multivariate Analysis and Derivation of Discriminant Functions

Multivariate analysis is utilized to derive linear discriminant functions that can distinguish regular users from irregular users of each type of fish on the basis of their attitudinal and demographic characteristics. The BMDO 7M Stepwise Discriminant Analysis Program is used for this purpose. It scans the 24 attitudinal and the 12 demographic variables and selects for inclusion in the discriminant function those variables which add most to the explanation of the variance between the group centroids (vectors of means). A variable is entered into the discriminant function only if the contribution obtained by adding the variable to the discriminant function is significant at a specified level. The .05 level of significance is the cut-off level for all discriminant analyses in this study.

The BMDO 7M Stepwise Discriminant Analysis Program introduces variables into the discriminant function in a stepwise

(one by one) manner until the particular combination of variables which maximizes the ratio of the between group variance to the within group variance is determined. The thrust of discriminant analysis, consequently, is multivariate in nature as compared to the univariate approach.

The use of discriminant analysis not only isolates the significant variables which help in identifying the regular from irregular users of each type of fish, but it also provides for determination of the relative importance of the variables in terms of their ability to distinguish between regular and irregular users. The relative importance of each variable is discernible directly from the absolute size of all other discriminant coefficients for the other variables in the discriminant function.

In all discriminant analyses, the predictive efficiency of each discriminant function is evaluated by testing the significance of the difference between the proportion of correctly classified cases obtained by using the discriminant function, and the proportion of correctly classified cases that would be expected by chance. In order to reduce the possibility of biasing these tests by applying them to the same sample of data used to derive the discriminant functions, the entire sample is divided into two subsamples, with an equal number of regular and irregular users in each subsample. These are identified as the analysis sample and the validation sample. The discriminant functions are first derived

using the analysis sample as a base and then are applied to the validation sample as a test of their predictive efficacy. The percentages of respondents correctly classified by each of the discriminant functions are summarized in the last part of this section.

Best Combination of Discriminant Variables

Best Combination of Discriminant Variables of Finfish User Groups. To classify a respondent as a regular or an irregular user of a given type of fish, his values for each of the discriminant variables derived by multiple discriminant analyses are inserted into the appropriate discriminant equation. By solving the equation, a numerical score (Z_i) is obtained for the respondent. The respondent is then assigned to the group (Z_1 or Z_2) whose centroid is closest to his score. The discriminant coefficients associated with each of the variables are the "weights" of the respective variables. The greater the numerical value or weight of the coefficient, the stronger the variable in discriminating between a regular and an irregular user. The algebraic sign associated with each coefficient is indicative of the direction of effect of each variable.

Only the "best combinations" of discriminant variables are presented at this juncture. For each type of fish, discriminant analyses were run separately for the attitudinal and demographic variables. The significant variables from

each of the analyses were then combined to compute "the best combinations" of variables.

The best combinations of significant independent attitudinal and demographic variables, along with their respective coefficients for finfish, are given in Table 13. For fresh finfish, 10 independent variables are significant at the .05 level or better. Two of the 12 demographic variables and eight of the 24 attitudinal variables are significant in identifying regular from irregular users of fresh finfish. In accordance with their numerical coefficients, the two demographic variables rank first and second in relative strength in discriminating between a regular and irregular user of fresh finfish.

Recasting the data in Table 13 in the form of the discriminant equation for fresh finfish, the following discriminant equation is obtained:

$$Z_i = -0.355\,X_1 + 0.342\,X_2 + 0.297\,X_3 + 0.283X_4 + 0.282X_5 + 0.257X_6 + 0.189\,X_7 + 0.177X_8 + 0.169X_9 + 0.157X_{10}$$

where Z_i is Z_1 = -0.78664 (regular user centroid)
or Z_2 = +0.47578 (irregular user centroid)

X_1 = age of housewife
X_2 = white or not
X_3 = taste
X_4 = appearance
X_5 = guest meal
X_6 = preparation cf. meats
X_7 = availability
X_8 = taste cf. meats
X_9 = diet meal
X_{10} = safety cf. meats

TABLE 13

DISCRIMINANT COEFFICIENTS FOR SIGNIFICANT INDEPENDENT ATTITUDINAL AND DEMOGRAPHIC VARIABLES FROM BEST COMBINATION OF VARIABLES ANALYSIS FOR FRESH, FROZEN UNPREPARED, AND FROZEN PREPARED FINFISH

Discriminant Variable*	Discriminant Coefficients and Ranks by Importance					
	Fresh		Frozen Unprepared		Frozen Prepared	
	Discrim. Coeff.	Rank	Discrim. Coeff.	Rank	Discrim. Coeff.	Rank
Attitudinal						
Taste	+0.297	3	+0.479	1	+0.534	1
Taste cf. meats	+0.177	8	+0.197	6	+0.273	6
Cost cf. meats			+0.148	9		
Preparation			+0.256	4		
Preparation cf. meats	+0.257	6				
Appearance	+0.283	4				
Appearance cf. meats					+0.320	
Availability	+0.189	7				
Quality					+0.334	2
Guest meal	+0.282	5	+0.351	2	+0.331	4
Diet meal	+0.169	9	+0.177	8		
Safety			+0.195	7		
Safety cf. meats	+0.157	10				
Demographic						
Age of head of household			-0.292	3		
Age of housewife	-0.355	1				
Size of household					-0.330	3
Income			-0.221	5		
White or not	+0.342	2				

*All variables significant at .05 level or better.

Source: Computer print-out from BMDO 7M stepwise Discriminant Analysis Program.

In solving the equation, a respondent's values for each of the 10 variables (x_1 to x_{10}) are inserted as described above. The respondent is then classified as either a regular user (X_1) or an irregular user (Z_2) according to his score. The data for each type of fish may be recast into a similar appropriate discriminant equation. The discriminant equations for the other types of fish are not reproduced here because the data are already given in tabular form, and because limited space precludes the reproduction of each equation.

Summary of Discriminant Analyses of Finfish. Examination of the data in Table 13 for each type of finfish, singly as well as in combination, shows the following:

1. Ten of the 36 attitudinal and demographic variables are significant in discriminating between regular and irregular users of fresh finfish; nine variables are significant in discriminating between regular and irregular users of frozen unprepared finfish; and only six variables are significant in identifying regular versus irregular consumers of frozen prepared finfish.

2. The attitudinal variables, taste, taste compared to meat, and guest meal are found in all three discriminant equations for finfish. Taste ranks first in the discriminant equations for frozen unprepared as well as frozen prepared finfish, and third for fresh finfish. The positive signs associated with the equations indicate the higher the rating, the more likely is the respondent to be a regular user. The

variable guest meal ranks higher in all three discriminant equations than taste compared to meat.

3. The variable diet meal shows up in the equations for fresh and frozen unprepared finfish, but not for frozen prepared finfish. As a discriminating factor, diet meal ranks ninth and eighth in the two equations, respectively.

4. The attitudinal variables which appear only in the discriminant equation for fresh finfish are: appearance, availability, preparation compared to meat, and safety compared to meat. People who rate fresh finfish higher on these variables are more likely to be regular users.

Among the discriminating factors for finfish, the attitudinal variables, preparation, safety, and cost compared to meat, appear only in the equation for frozen unprepared finfish. Irregular users obviously rate frozen unprepared finfish lower on these characteristics than regular users.

Quality and appearance compared to meat are the two attitudinal variables in the discriminant equations for finfish that appear solely for frozen prepared finfish. Respondents who give lower ratings on quality and appearance of frozen prepared finfish in comparison to meat tend to be irregular users.

5. Five of the 12 demographic variables are significant in discriminating between regular and irregular users of

finfish; however, none of these appears in more than one of the three equations. For fresh fish, the age and race of the housewife are significant, ranking first and second, respectively. The younger the housewife, the less likely she is to be a regular user of fresh finfish. Moreover, blacks are more likely to be regular consumers of fresh finfish than whites.

The age of the head of the household (not housewife) and family income are significant discriminating demographic variables for frozen unprepared finfish. Households with lower incomes and younger heads of households are essentially irregular users of frozen unprepared finfish.

Size of household is a significant discriminant demographic variable for frozen prepared finfish. Smaller households are likely to be irregular users of frozen prepared finfish in comparison to larger households.

6. Overall, the attitudinal variables dominate each discriminant function in terms of their numbers, and generally rank higher in relative importance compared to demographic variables. This holds true except for fresh finfish, where the two demographic variables ranked first and second.

Best Combination of Discriminant Variables of Shellfish User Groups

The discriminant attitudinal and demographic variables, as well as their discriminant coefficients for the three types of shellfish, are reproduced in Table 14. These may

TABLE 14

DISCRIMINANT COEFFICIENTS FOR SIGNIFICANT INDEPENDENT ATTITUDINAL AND DEMOGRAPHIC VARIABLES FROM BEST COMBINATION OF VARIABLES ANALYSIS FOR FRESH, FROZEN UNPREPARED, AND FROZEN PREPARED SHELLFISH

	Discriminant Coefficients and Ranks by Importance					
	Fresh		Frozen Unprepared		Frozen Prepared	
Discriminant Variable*	Discrim. Coeff.	Rank	Discrim. Coeff.	Rank	Discrim. Coeff.	Rank
Attitudinal						
Taste	+0.327	2	+0.513	1	+0.402	2
Taste cf. meats	+0.240	6				
Nutrition cf. meats					+0.286	5
Aroma					+0.289	4
Cooking	+0.280	4	+0.316	4		
Cooking cf. meats					+0.263	6
Appearance	+0.324	3				
Appearance cf. meats			+0.245	6	+0.317	3
Quality cf. meats					+0.403	1
Guest meal			+0.333	2		
Safety cf. meats	+0.234	7				
Demographic						
Age of housewife	-0.364	1				
Age of head of household			-0.256	5		
Education of head of household			-0.331	3		
Size of household					-0.237	7
Income	-0.221	8				
White or not	+0.250	5				

*All variables significant at .05 level or better.

Source: Computer print-out from BMDO 7M Stepwise Discriminant Analysis Program.

be rewritten in equation form as indicated above.

Summary of Discriminant Analyses of Shellfish. The data in Table 14 may be summarized in terms of the following observations:

1. Of the 36 attitudinal and demographic variables, eight appear in the discriminant equation for fresh shellfish; six are significant in discriminating between regular and irregular users of frozen unprepared shellfish; while seven variables are significant in classifying respondents as regular versus irregular consumers of frozen prepared shellfish.

2. Unlike finfish, the discriminant functions for shellfish contain only one common attitudinal variable, namely, taste. Taste ranks first in the frozen unprepared shellfish discriminant equation and second in the fresh shellfish and frozen prepared shellfish discriminant equations. For each type of shellfish, those who rate taste higher are more likely to be regular users.

3. Cooking is a significant attitudinal variable in discriminating between regular and irregular users of fresh and frozen unprepared shellfish. Appearance compared to meat appears in the discriminant equations for frozen unprepared and frozen prepared shellfish. It is interesting to note that these are both frozen products. Respondents who rate the appearance of either frozen unprepared or frozen prepared shellfish favorably compared to meat tend

to be regular users. Similarly, those who think fresh or frozen unprepared shellfish is easy to cook are generally regular instead of irregular users.

4. Attitudinal variables significant in only one of the discriminant equations for shellfish are more numerous for shellfish than finfish. Appearance, taste compared to meat, and safety compared to meat are all single discriminating attitudinal variables within the fresh shellfish discriminant equation. If the respondent believes fresh shellfish is attractive in appearance and compares favorably to meat in taste and safety, he is probably a regular user.

Although the guest meal variable is a common discriminating factor in all finfish equations, among the shellfish equations it is significant only for frozen unprepared shellfish. Obviously, regular users are more likely to rate frozen unprepared shellfish better as a guest meal than irregular users.

Turning to frozen prepared shellfish, quality compared to meat ranks first - a trifle higher than taste - as the strongest discriminating variable. Aroma, nutrition compared to meat, and cooking compared to meat constitute the other single attitudinal variables helpful in identifying regular versus irregular users.

5. Turning to the demographic variables, as is true for finfish, none of the six significant variables appears in more than one discriminant equation. Three of the six

demographic variables are in the fresh shellfish discriminant equation. The age of the housewife ranks first; income ranks last. The younger the housewife and the lower the family income, the less likely it is that the respondent is a regular consumer of fresh shellfish. Also, blacks are more likely to be regular users of fresh shellfish than whites.

The age and education of the head of household are significant demographic variables in the discriminant equation for frozen unprepared shellfish. Younger household heads, as well as those with less education, are more likely to be irregular users of frozen unprepared shellfish.

The only significant demographic variable in the frozen prepared shellfish discriminant equation is size of household. The smaller households are the least likely to be regular users.

6. A recapitulation of the overall findings is identical to that for finfish. That is to say, the attitudinal variables dominate each discriminant function in numbers and generally rank higher in relative importance than demographic variables, with the exception of fresh shellfish. In this instance age of housewife ranked first.

Best Combination of Discriminant Variables of Canned Fish Users

The discriminant variables and their coefficients for canned fish are shown in Table 15. Since canned fish is

treated as a given product category, discussion of various types of canned fish is precluded and only a summary of the discriminant analyses is given.

1. The discriminant equation for canned fish contains seven variables; five are attitudinal, two are demographic. Attitudinal variables dominate the discriminant function for canned fish just as they do for fin and shellfish.

2. Taste is by far the strongest discriminating variable. It not only ranks first, but its coefficient is three times larger than the coefficient of the second most important variable. Aside from taste, the other four discriminating attitudinal variables are: appearance, quality, preparation, and cooking compared to meat. The better the respondent rates these characteristics, the more likely for him to be a regular user of canned fish.

3. The two significant demographic discriminant variables are size of household (ranked second) and education of head of household (ranked fourth). The signs of these coefficients indicate that smaller size households and those whose heads have less education are likely to be irregular canned fish users. Conversely, bigger households and households whose heads are better educated are inclined to be regular users of canned fish.

Review of Respondents Correctly Classified by the Discriminant Functions

Just how effective are the discriminant functions in

TABLE 15
SIGNIFICANT INDEPENDENT ATTITUDINAL AND DEMOGRAPHIC VARIABLES AND THEIR DISCRIMINANT COEFFICIENTS FOR CANNED FISH

Discriminant Variables*	Discriminant Coefficient	Rank by Importance*
Attitudinal		
Taste	+0.729	1
Preparation	+0.167	7
Cooking cf. meats	+0.189	5
Appearance	+0.253	3
Quality	+0.178	6
Demographic		
Size of Household	-0.275	2
Education of Head of Household	-0.195	4

Source: Computer print-out from BMDO 7M Stepwise Discriminant Analysis Program.

*All variables significant at .05 level or better.

classifying respondents as either regular or irregular users of each type of fish? After the 1,730 respondents are first identified as regular or irregular users of the respective types of fish, equal numbers of regular and irregular users are then divided into an analysis subsample and a validation subsample. The discriminant equations are derived with the data from the analysis subsamples and validated by utilizing the data from the validation subsamples with the discriminant equations. Lastly, the predictive results are compared to percentages of correct classifications expected by random proportional guessing to test for statistical significance.

Discriminant equations for each type of fish are tested as to the proportion of respondents classified correctly according to (a) attitudinal variables; (b) demographic variables; and (c) the best combination of variables presented above in this section. Table 16 gives a summary of the percentages of respondents classified correctly. From the data in Table 16, it is evident that most of the discriminant functions, with the exception of those for shellfish, are able to make statistically significant correct classifications. Although the percentages of respondents classified correctly by the discriminant functions for shellfish are not statistically significant when compared to the proportional chance criterion, the discriminant functions for shellfish are able to classify respondents correctly at levels (70 per cent) similar to the other discriminant functions. Clearly, the

TABLE 16
SUMMARY OF CORRECT CLASSIFICATION
PERCENTAGES FOR DISCRIMINANT FUNCTIONS

Discriminant Function	Percentage Correctly Classified as Regular or Irregular Users	
	Analysis Samples	Validation Samples
Fresh finfish		
Attitudinal variables	72.4	71.4
Demographic variables	62.7	59.9
Best combination of variables	73.6	71.8
Frozen unprepared finfish		
Attitudinal variables	72.4	71.2
Demographic variables	55.6*	55.2*
Best combination of variables	73.1	71.9
Frozen prepared finfish		
Attitudinal variables	67.8	65.5
Demographic variables	60.5*	47.0*
Best combination of variables	68.8	67.1
Fresh shellfish		
Attitudinal variables	69.3*	65.3*
Demographic variables	57.4*	54.4*
Best combination of variables	71.4*	66.4*
Frozen unprepared shellfish		
Attitudinal variables	70.2*	70.3*
Demographic variables	59.2*	53.2*
Best combination of variables	70.6*	69.4*
Frozen prepared shellfish		
Attitudinal variables	71.4*	71.2*
Demographic variables	60.5*	53.5*
Best combination of variables	70.5*	69.0*
Canned fish		
Attitudinal variables	72.7	69.9
Demographic variables	60.2	56.6
Best combination of variables	73.6	70.8

Source: Computer print-out from BMDO7M Stepwise Discriminant Analysis Program Program.

*These percentages are non-significant at the .05 level when compared to percentages of correct classifications expected by random proportional guessing.

random proportional chance test is not an appropriate test of statistical significance when the number of regular users of shellfish in the analysis and validation subsamples is so small in comparison to the very large proportion of irregular users.

Comparison of the percentages in Table 16 indicates that, in all cases, attitudinal discriminant functions are able to make higher levels of correct classifications than demographic discriminant functions. Furthermore, the combining of demographic and attitudinal variables in the best combination of variables functions improves correct classifications very little over that obtained by using attitudinal variables alone. In fact, correct classification percentages for the best combination of variables functions for frozen unprepared and frozen prepared shellfish are actually less than those for their respective attitudinal discriminant functions. That is to say, by utilizing the discriminant functions for attitudinal variables alone, one is able to discriminate between regular and irregular users as well as, or better than, the results obtained by utilizing discriminant functions containing the significant attitudinal variables plus the significant demographic variables, or by using significant demographic variables alone.

Utilization of Findings

Throughout the sections dealing with univariate and

multivariate analyses, suggestions have been given either overtly or implicitly how the industry may use the results or findings of this study. Rather than recapitulate all of this material, a short summary of the results and their utilization is presented:

1. This study unmistakably shows that attitudinal variables are more important than demographic variables in the consumer decision process for fish. Hopefully, increased emphasis will be directed toward the attitudinal rather than the demographic aspects of the decision process.

2. The discriminant functions point out the significant variables on which regular and irregular users differ. A shortcoming of discriminant analysis, however, is the fact that it provides no explanation why a variable may be significant or non-signficant. For example, households with better educated family heads are more likely to be regular users of canned fish. Why? What is the logical explanation? If these people are less fearful of contamination, perhaps safety or safety compared to meat should appear as discriminant variables, but they are not found in the discriminant equation. If the better educated consider the price of canned fish a "good" buy, one would expect cost or cost compared to meat in the discriminant equation. Again, these variables are conspicuous by their absence. The statistical techniques produce the discriminant functions, but the researchers and knowledgeable tradesmen in the industry and channels of

distribution must provide the explanations or undertake additional research concerning the phenomena.

3. Despite the fact that discriminant functions do not provide explanations, they are helpful nonetheless because they do indicate the significant attitudinal and demographic discriminant variables. Among the significant demographic variables, for instance, older respondents are regular users while younger respondents are irregular users of both fresh and frozen unprepared finfish, and shellfish. Directing the industry's marketing strategies toward these younger untapped market segments is essential to increasing the demand for fresh and frozen unprepared finfish and shellfish.

4. The discriminant functions could be used in estimating demand in various geographic areas for various types of fish. By conducting a survey utilizing a shortened form of the questionnaire containing the significant discriminant attitudinal and demographic variables for the particular type of fish under study, an approximation of the number of regular and irregular users could be obtained. In addition to the attitudinal and demographic factors, the questionnaire should have a section concerning the quantity of that type of fish consumed by the respondents during a designated period of time. By multiplying the quantities consumed by the proportion of total families in an area that are regular users and summing this figure with the quantity consumed by the

proportion of total families who are irregular users, an overall estimate of total demand could be obtained. To estimate potential demand under given conditions (i.e., specific price, sufficient supply of type of fish, etc.), it would be necessary to determine how much more fish might be consumed by converting various proportions of the irregular users into regular users.

5. The attitudinal profiles and the univariate analyses of these profiles should also prove useful in many ways. For example, the attitudinal profiles for regular and irregular users of fresh finfish show that regular users rate fresh finfish favorably in appearance, while irregular users rate it unfavorably. This points out an area where industry efforts in the form of better display or even packaging might possibly stimulate the demand for fresh finfish. Regular and irregular users' perceptions of the availability of fresh finfish is another finding that should prove helpful to the industry. Both regular and irregular users indicate fresh finfish is somewhat difficult to find, thereby supporting the hypothesis that increased availability of fresh finfish in inland areas may stimulate sales.

6. Similarly, the group mean profile values for shellfish suggest for the most part that attitudes towards cost of shellfish compared to meat are unfavorable. The industry, consequently, should either attempt to reduce cost or justify cost in the mind of the consumer in terms of "value obtained."

On the other hand, the positive attitudes towards shellfish as an appropriate diet meal or even a special treat for dinner could be further emphasized.

7. In the case of canned fish, the attitudinal profiles show canned fish already has a favorable image as an inexpensive meal, a recommended diet meal, and is readily available at retail outlets. Adversely, canned fish has a poor image as a dinner treat or as a guest meal. Respondents also dislike its aroma and appearance compared to meat. Since the industry promotes the consumption of fish by distributing recipes, it should distribute more recipes featuring canned fish as a special dinner treat or guest meal. The promotion should also be directed to the "clean ocean air aroma" and "fine, meaty" appearance of canned fish such as tuna, mackerel, salmon, lobster, or oysters.

These examples suggest how the research technique and findings in this study may be employed by the reader. Obviously, further interpretation would belabor the material needlessly.

NOTE: For additional information concerning research methodology or results of multivariate analyses of attitudinal and demographic variables, a loan copy of the unpublished DBA dissertation, An Analysis of Consumer Attitudinal and Demographic Variables for Fresh, Frozen, and Canned Finfish and Shellfish, by Peter M. Sanchez may be obtained at the address below:

Dr. Leonard J. Konopa
College of Business Administration
Kent State University
Kent, Ohio 44242

APPENDIX

COVERING LETTER - QUESTIONNAIRE

KENT STATE
UNIVERSITY
Kent, Ohio 44242

Center for Business and
Economic Research
Institute for 21st
Century Business
SEA GRANT PROJECT
131 Rockwell Hall
[216] 672-4608

Dear Householder:

You have been selected as a representative homemaker to tell us how consumers and menu-planners use fish and seafood prodocuts as a part of their meals. With all the discussions and articles in the paper and elsewhere, you probably are aware that this is a problem of concern not only to those in the fishing industry but also to your retailers and to you.

The only way to find out what you think about such products is to ask you. Thatis what we at Kent State University are doing through the enclosed questionnaire. Even if you do not use fish, your replies are important in this study. It will take only a few minutes of your time to answer it, put it in the addressed, postage-free, envelope, and mail it to us.

This survey is sponsored by an agency of the Federal government, not by members of the fishing industry. Your answers will be put together with those of your neighbors in Summit and Cuyahoga counties, so that yours will not be identified with you.

Your cooperation will be appreciated and may aid in your retailers and suppliers of seafood products doing a better job for you. Please read over the instructions to the questionnaire, answer it and send it back to us. Remember, only YOU can aid in this project.

Sincerely yours,

D. F. Mulvihill
Coordinator

DFM:jd

Enclosure

KENT STATE UNIVERSITY

Sea Grant Project

Room 131, Rockwell Hall
Kent, Ohio 44242

Telephone: 216-672-4608

CONSUMER SURVEY QUESTIONNAIRE

WHAT WE ARE TALKING ABOUT

We want you to give us your general opinions on 7 different types of fish and shellfish. The following is a list of the 7 different types and what we mean by them:

1. FRESH FISH— This means all types of fish such as haddock, cod, flounder, or perch that are bought unfrozen and unprepared.
2. FROZEN UNPREPARED FISH— This means all types of fish such as haddock, cod, flounder, or perch that are bought frozen but without breading, etc.
3. FROZEN PREPARED FISH— This means all types of fish such as haddock, cod, flounder, or perch that are bought frozen and ready to cook, for example, fish sticks or breaded fillets.
4. FRESH SHELLFISH— This means all types of shellfish such as shrimp, clams, oysters, or lobsters that are bought unfrozen and unprepared.
5. FROZEN UNPREPARED SHELLFISH— This means all types of shellfish such as shrimp, clams, oysters, or lobsters that are bought frozen but without breading, etc.
6. FROZEN PREPARED SHELLFISH— This means all types of shellfish such as shrimp, clams, oysters, or lobsters that are bought frozen and ready to cook, for example, breaded shrimp or breaded clams.
7. CANNED FISH— This means all types of fish that are bought canned.

HOW TO USE THE DESCRIPTIVE SCALES FOR GIVING YOUR OPINIONS

For each descriptive scale please place a checkmark in that space which best describes your feelings. The direction toward which you place your check depends on which one of the two ends of the scale seems most true as you see it. For example, if you feel that the taste of FRESH FISH is quite good and the taste of FROZEN UNPREPARED FISH is slightly bad, you would place your checkmarks as follows:

TASTE	Extremely	Quite	Slightly	Neither One	Slightly	Quite	Extremely	
Good taste	←							→ Bad taste
FRESH FISH		X						
FROZEN UNPREPARED SHELLFISH					X			

If you cannot decide or if you consider both ends of the scale equally true, place your check in the space marked "neither one."

VERY IMPORTANT

1. NEVER PUT MORE THAN ONE CHECKMARK ON A SCALE.
2. CHECK EVERY SCALE FOR EACH TYPE OF FISH AND SHELLFISH; DO NOT OMIT ANY.
3. REMEMBER, THERE ARE NO RIGHT OR WRONG ANSWERS. WE WANT ONLY YOUR OPINIONS.
4. WORK QUICKLY; GIVE YOUR FIRST IMPRESSION IN EACH ANSWER.

1. TASTE

	Extremely	Quite	Slightly	Neither One	Slightly	Quite	Extremely	
Good taste	←							→ **Bad taste**
FRESH FISH								
FROZEN UNPREPARED FISH								
FROZEN PREPARED FISH								
FRESH SHELLFISH								
FROZEN UNPREPARED SHELLFISH								
FROZEN PREPARED SHELLFISH								
CANNED FISH								
Less tasty than most meats	←							→ **Tastier than most meats**
FRESH FISH								
FROZEN UNPREPARED FISH								
FROZEN PREPARED FISH								
FRESH SHELLFISH								
FROZEN UNPREPARED SHELLFISH								
FROZEN PREPARED SHELLFISH								
CANNED FISH								

2. NUTRITION (HEALTHFULNESS)

	Extremely	Quite	Slightly	Neither One	Slightly	Quite	Extremely	
Unnutritious	←							→ **Nutritious**
FRESH FISH								
FROZEN UNPREPARED FISH								
FROZEN PREPARED FISH								
FRESH SHELLFISH								
FROZEN UNPREPARED SHELLFISH								
FROZEN PREPARED SHELLFISH								
CANNED FISH								
More nutritious than most meats	←							→ **Less nutritious than most meats**
FRESH FISH								
FROZEN UNPREPARED FISH								
FROZEN PREPARED FISH								
FRESH SHELLFISH								
FROZEN UNPREPARED SHELLFISH								
FROZEN PREPARED SHELLFISH								
CANNED FISH								

3. COST

	Extremely	Quite	Slightly	Neither One	Slightly	Quite	Extremely	
Reasonably priced	←							→ **Unreasonably priced**
FRESH FISH								
FROZEN UNPREPARED FISH								
FROZEN PREPARED FISH								
FRESH SHELLFISH								
FROZEN UNPREPARED SHELLFISH								
FROZEN PREPARED SHELLFISH								
CANNED FISH								
Less thrifty buy than most meats	←							→ **Thriftier buy than most meats**
FRESH FISH								
FROZEN UNPREPARED FISH								
FROZEN PREPARED FISH								
FRESH SHELLFISH								
FROZEN UNPREPARED SHELLFISH								
FROZEN PREPARED SHELLFISH								
CANNED FISH								

4. AROMA
(ODOR, SMELL)

	Extremely	Quite	Slightly	Neither One	Slightly	Quite	Extremely	
Bad aroma	←							→ Good aroma
FRESH FISH								
FROZEN UNPREPARED FISH								
FROZEN PREPARED FISH								
FRESH SHELLFISH								
FROZEN UNPREPARED SHELLFISH								
FROZEN PREPARED SHELLFISH								
CANNED FISH								
Better aroma than most meats	←							→ Worse aroma than most meats
FRESH FISH								
FROZEN UNPREPARED FISH								
FROZEN PREPARED FISH								
FRESH SHELLFISH								
FROZEN UNPREPARED SHELLFISH								
FROZEN PREPARED SHELLFISH								
CANNED FISH								

5. PERISHABILITY

	Extremely	Quite	Slightly	Neither One	Slightly	Quite	Extremely	
Keeps a long time	←							→ Spoils quickly
FRESH FISH								
FROZEN UNPREPARED FISH								
FROZEN PREPARED FISH								
FRESH SHELLFISH								
FROZEN UNPREPARED SHELLFISH								
FROZEN PREPARED SHELLFISH								
CANNED FISH								
Spoils faster than most meats	←							→ Keeps longer than most meats
FRESH FISH								
FROZEN UNPREPARED FISH								
FROZEN PREPARED FISH								
FRESH SHELLFISH								
FROZEN UNPREPARED SHELLFISH								
FROZEN PREPARED SHELLFISH								
CANNED FISH								

6. PREPARATION BEFORE COOKING

	Extremely	Quite	Slightly	Neither One	Slightly	Quite	Extremely	
Difficult to prepare	←							→ Easy to prepare
FRESH FISH								
FROZEN UNPREPARED FISH								
FROZEN PREPARED FISH								
FRESH SHELLFISH								
FROZEN UNPREPARED SHELLFISH								
FROZEN PREPARED SHELLFISH								
CANNED FISH								
Easier to prepare than most meats	←							→ More difficult to prepare than most meats
FRESH FISH								
FROZEN UNPREPARED FISH								
FROZEN PREPARED FISH								
FRESH SHELLFISH								
FROZEN UNPREPARED SHELLFISH								
FROZEN PREPARED SHELLFISH								
CANNED FISH								

7. COOKING

Extremely | Quite | Slightly | Neither One | Slightly | Quite | Extremely

Easy to cook ← → Difficult to cook

FRESH FISH
FROZEN UNPREPARED FISH
FROZEN PREPARED FISH
FRESH SHELLFISH
FROZEN UNPREPARED SHELLFISH
FROZEN PREPARED SHELLFISH
CANNED FISH

More difficult to cook than most meats ← → Easier to cook than most meats

FRESH FISH
FROZEN UNPREPARED FISH
FROZEN PREPARED FISH
FRESH SHELLFISH
FROZEN UNPREPARED SHELLFISH
FROZEN PREPARED SHELLFISH
CANNED FISH

8. APPEARANCE
(COLOR, EYE-APPEAL)

Extremely | Quite | Slightly | Neither One | Slightly | Quite | Extremely

Unappetizing appearance ← → Appetizing appearance

FRESH FISH
FROZEN UNPREPARED FISH
FROZEN PREPARED FISH
FRESH SHELLFISH
FROZEN UNPREPARED SHELLFISH
FROZEN PREPARED SHELLFISH
CANNED FISH

More appetizing appearance than most meats ← → Less appetizing appearance than most meats

FRESH FISH
FROZEN UNPREPARED FISH
FROZEN PREPARED FISH
FRESH SHELLFISH
FROZEN UNPREPARED SHELLFISH
FROZEN PREPARED SHELLFISH
CANNED FISH

9. QUALITY
(GRADE, CUT, FRESHNESS)

Extremely | Quite | Slightly | Neither One | Slightly | Quite | Extremely

Reliable quality ← → Unreliable quality

FRESH FISH
FROZEN UNPREPARED FISH
FROZEN PREPARED FISH
FRESH SHELLFISH
FROZEN UNPREPARED SHELLFISH
FROZEN PREPARED SHELLFISH
CANNED FISH

Less reliable quality than most meats ← → More reliable quality than most meats

FRESH FISH
FROZEN UNPREPARED FISH
FROZEN PREPARED FISH
FRESH SHELLFISH
FROZEN UNPREPARED SHELLFISH
FROZEN PREPARED SHELLFISH
CANNED FISH

10. AVAILABILITY IN FOOD STORES

	Extremely	Quite	Slightly	Neither One	Slightly	Quite	Extremely	
Not usually available	←							→ Usually available
FRESH FISH								
FROZEN UNPREPARED FISH								
FROZEN PREPARED FISH								
FRESH SHELLFISH								
FROZEN UNPREPARED SHELLFISH								
FROZEN PREPARED SHELLFISH								
CANNED FISH								

11. IMAGE AS A MENU ITEM

	Extremely	Quite	Slightly	Neither One	Slightly	Quite	Extremely	
Special treat for dinner	←							→ Just another meal
FRESH FISH								
FROZEN UNPREPARED FISH								
FROZEN PREPARED FISH								
FRESH SHELLFISH								
FROZEN UNPREPARED SHELLFISH								
FROZEN PREPARED SHELLFISH								
CANNED FISH								
Wouldn't consider serving it to guests	←							→ Nice meal to serve to guests
FRESH FISH								
FROZEN UNPREPARED FISH								
FROZEN PREPARED FISH								
FRESH SHELLFISH								
FROZEN UNPREPARED SHELLFISH								
FROZEN PREPARED SHELLFISH								
CANNED FISH								
Good meal for weight watchers	←							→ Bad meal for weight watchers
FRESH FISH								
FROZEN UNPREPARED FISH								
FROZEN PREPARED FISH								
FRESH SHELLFISH								
FROZEN UNPREPARED SHELLFISH								
FROZEN PREPARED SHELLFISH								
CANNED FISH								

12. WHOLESOMENESS

	Extremely	Quite	Slightly	Neither One	Slightly	Quite	Extremely	
Unsafe to eat	←							→ Safe to eat
FRESH FISH								
FROZEN UNPREPARED FISH								
FROZEN PREPARED FISH								
FRESH SHELLFISH								
FROZEN UNPREPARED SHELLFISH								
FROZEN PREPARED SHELLFISH								
CANNED FISH								
More safe to eat than most meats	←							→ Less safe to eat than most meats
FRESH FISH								
FROZEN UNPREPARED FISH								
FROZEN PREPARED FISH								
FRESH SHELLFISH								
FROZEN UNPREPARED SHELLFISH								
FROZEN PREPARED SHELLFISH								
CANNED FISH								

13. How often do you buy each of the following forms of fish for use at home?

	Seldom or never	Every 2 to 3 months	About once a month	2 or 3 times a month	Once a week or more
FRESH FISH	☐	☐	☐	☐	☐
FROZEN UNPREPARED FISH	☐	☐	☐	☐	☐
FROZEN PREPARED FISH	☐	☐	☐	☐	☐
FRESH SHELLFISH	☐	☐	☐	☐	☐
FROZEN UNPREPARED SHELLFISH	☐	☐	☐	☐	☐
FROZEN PREPARED SHELLFISH	☐	☐	☐	☐	☐
CANNED FISH	☐	☐	☐	☐	☐

14. Which of the following is most often true in your decision about buying fresh fish? (Check one)

☐ I decide to buy fresh fish before going to the store.

☐ I decide to buy fresh fish when I see it in the store.

☐ I seldom or never buy fresh fish.

15. If the food stores where you regularly shop carried fresh fish and shellfish daily, would you serve it to your family more often?

Yes ☐ Why? _____

No ☐ Why? _____

Don't know ☐

16. Eventually several less well-known types of fish and shellfish may become available in food stores. Do you think you will try these new varieties?

Yes ☐ Why? _____

No ☐ Why? _____

Don't know ☐

FOR CLASSIFICATION PURPOSES ONLY: All information will remain confidential.

17. Please check one. Are you . . . . ?

Married ☐ Single ☐ Widowed ☐ Separated ☐

18. Your occupation _____

19. Husband's occupation _____

20. Your approximate age:

Under 26 ☐ 36 to 45 ☐ 26 to 65 ☐

26 to 35 ☐ 46 to 55 ☐ over 65 ☐

21. Husband's approximate age:

Under 26 ☐ 36 to 45 ☐ 26 to 65 ☐

26 to 35 ☐ 46 to 55 ☐ over 65 ☐

22. Number of children at home _____

23. Their ages _____

24. Including yourself, how many people live in your household? _____

25. How far did you go in school?

Elementary school ☐ Some high school ☐ High school grad. ☐ Some college ☐ College grad. ☐

26. How far did your husband go in school?

Elementary school ☐ Some high school ☐ High school grad. ☐ Some college ☐ College grad. ☐

27. Please indicate the approximate annual income in your household:

Under $4,000 ☐ $6,000-7,999 ☐ $10,000-11,999 ☐ Over $14,000 ☐

$4,000-5,999 ☐ $8,000-9,999 ☐ 12,000-13,999 ☐

28. Your religious preference? (Optional)

Protestant ☐ Catholic ☐ Jewish ☐ Other ☐

29. Your race? (Optional)

White ☐ Black ☐ Oriental ☐ Other ☐